American Journal of Public Health
and THE NATION'S HEALTH

Volume 37 October, 1947 Number 10

A Future for Industrial Medicine*

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INDUSTRIAL medicine is in a state of flux. It appears to be approaching maturity, but as yet the ultimate pattern has not become fixed. Physicians, employers, and workers all have a stake in the future of industrial medicine, and all three, especially through their respective organized bodies, will play a part in determining the shape of things to come. At the present moment medicine and its allied professions are in a position to assume leadership in this field. If this is to be done it will be necessary to dispel some of the confusion which now exists and to have a clear idea of the objectives of industrial medicine as well as the methods of attaining these objectives.

SCOPE AND OBJECTIVES

Up to the present time, no satisfactory and generally accepted definition of industrial medicine has been proposed, although a number of authoritative organizations and individuals have stated what they consider to be its scope and objectives. The Council on Industrial Health of the American Medical Association, in a detailed statement published in 1940[1] states that "Industrial health is an inclusive term, incorporating three major types of activity.

"1. Medical and surgical care to accomplish prompt restoration to health and earning capacity following industrial accident or disease.

"2. Prevention of disease or injury in industry by the establishment of proper control over industrial environment.

"3. Education of employees about healthful living, both in and out of the industrial environment."

In another part of the same statement the Council defines the scope of medical service to be provided by the medical department of an industry in the following terms:

"1. Regular appraisal of plant sanitation.

"2. Periodic inspection for occupational disease hazards.

"3. Adoption and maintenance of adequate control measures.

"4. Provision of first aid and emergency services.

"5. Prompt and early treatment for all illnesses resulting from occupational exposure.

"6. Reference to the family physician of individuals with conditions needing attention, coöperating with the patient and physician in every practical way to remedy the condition.

* Special Review Article prepared at the request of the Editorial Board.

"7. Uniform recording of absenteeism due to all types of disability.

"8. Impartial health appraisals of all workers.

"9. Provision of rehabilitation services within industry.

"10. The conduct of a beneficial health education program."

More recently the Council on Industrial Health has offered the following definition[2]: "Occupational Medicine deals with the restoration and conservation of health in relation to work, the working environment and maximum efficiency. It involves prevention, recognition and treatment of occupational disabilities and requires the application of special techniques in the fields of rehabilitation, environmental hygiene, toxicology, sanitation and human relations."

The American College of Surgeons in a recent publication[3] states that "The purpose of Industrial Medicine has been and always will be fundamentally the same, namely, 'the adequate care of the health of the industrial worker.'" In amplification of this statement four basic objectives of industrial medicine are given:

"1. To ascertain, by examination, the physical and mental fitness of employees for work.

"2. To maintain and improve the health and efficiency of those already employed.

"3. To educate the worker in accident prevention and personal hygiene.

"4. To reduce lost time and absenteeism from illness or injury."

The concepts quoted above may be regarded as representing those of "organized medicine." There appears to be one important fundamental difference between the point of view of the American Medical Association and that of the American College of Surgeons. The former strictly limits the concern of occupational medicine to disabilities arising out of work while the latter appears to believe that industrial medicine is concerned with all of the health problems of the worker, regardless of their origin.

It is interesting to note that Dr. Stanley J. Seeger, Chairman of the Council on Industrial Health of the American Medical Association, issued a statement in 1942[4] which places him in agreement with the American College of Surgeons and at variance with his own council. Dr. Seeger outlines the objectives of industrial medicine as being, among other things, "to procure and maintain fitness for work through efforts applied to the worker as an individual" and "to reduce all loss of time, absenteeism, and short work spans in industry the cause of which may be *in any way* (italics ours) related to health." This concept has been carried a little further by another outstanding industrial physician, Dr. Dan Lynch, who says[5]: "I recommend that industry generously and for profit arrange adequate medical care for the sick as well as the injured before compelled to do it, with coöperation by organized medicine, without it, if necessary." Dr. Lynch is one of the few industrial physicians who have openly advocated complete medical care as a part of industrial medicine.

The Chamber of Commerce of the United States and the National Association of Manufacturers may be cited as examples of employer groups which have shown active interest in industrial medicine. Both of these organizations have accepted the ideas of the Council on Industrial Health of the American Medical Association in regard to the scope and objectives of industrial medicine and both have been actively engaged in stimulating the establishment of medical services in industry.

A number of individual employers have extended their industrial medical services to include general medical care for their employees, and in some instances for the families of the employees as well. The medical services provided

may be comprehensive or limited and the costs are usually defrayed in part by the employees on a prepayment basis. The more important plans of this type have been summarized by Stern.[6]

Activities on the part of organized labor during the past few years have been responsible for the introduction of an entirely new idea into the field of industrial medicine, namely, the inclusion of various types of health and welfare clauses in labor-management agreements. As a result, the union contract has become an important factor in industrial health since it may include provisions for such things as medical care, hospital expenses, and cash benefits in the case of illness. Many of the agreements between management and labor which provide for medical benefits originated during World War II when wages were frozen and the government permitted medical benefits to be granted by employers in lieu of wage increases. Now there is a tendency on the part of labor to attempt to preserve these agreements. Since the availability of medical care and the payment of cash benefits in the event of sickness have a distinct effect on the duration of illness and on the duration of absence due to illness, health and welfare clauses in union contracts must be regarded as falling within the field of industrial medicine. What influences, if any, the Taft-Hartley Bill will have on this type of activity remains to be seen.

Passing mention must be made of the role of government in industrial medicine. Most important is the enactment and administration of workmen's compensation laws. At the present time all states except one have enacted workmen's compensation laws. A second important function of governmental agencies is the provision of certain preventive services, that branch of industrial medicine known as industrial hygiene. Activities in this field have been greatly expanded during the past ten years due largely to federal grants-in-aid made available to the states under the Social Security Act of 1935.

In summary, it may be said that the principal objective of industrial medicine is optimum health for all employed persons. This being the case, the scope of industrial medicine must be sufficiently broad to permit the attainment of this objective.

METHODS

While there is general agreement as to the objectives of industrial medicine and there are no irreconcilable differences in regard to its scope, there are wide divergences of opinion as to how the objectives are to be attained. The main issues in the controversy revolve around the functions of the various groups and individuals who are concerned with the different aspects of industrial medicine. Private practitioners, whether they be in general practice or specialists, physicians employed part time or full time in industry, certain physicians employed by governmental agencies and some employed by insurance companies and by labor unions may be mentioned among those who are involved in the practice of industrial medicine. Each one of these groups has its own set of interests and all of them must be given a voice when methods of practising industrial medicine are under discussion.

There is little doubt that the American Medical Association, as a national body and through its component state and county societies, is the most influential medical organization in the country. The great strength of the American Medical Association stems from its vast membership among private practitioners; therefore it is quite natural that in the basic philosophy of this organization the private practitioner is regarded as the key figure in any system or method of providing medical care. As applied to the practice of in-

dustrial medicine, this point of view is expressed as follows[1]: "The full-time industrial physician, if present trends prevail, will be less and less a therapist and more and more an administrator of public health through the application of industrial hygiene. In that capacity he should assume a public health function and act as a case finder for the private physician and specialist, through whom the direct remedial service should be applied." This statement, taken in conjunction with the list of functions of medical service in industry (quoted above), means that the American Medical Association would restrict the activities of the plant physician to little more than case finding, sanitary inspections, health education, and first aid work. This point of view, if generally adopted, might lead to a number of undesirable effects. In the first place it is unlikely that very many promising young physicians would be attracted into a field having such a limited scope. If all treatments except first aid are to be given in the offices of private physicians, an unreasonable amount of productive time would be lost while the injured, but not necessarily disabled, employee is travelling to and from the doctor's office and awaiting his turn to be treated. This would place a serious financial burden on industry and would discourage the employment of industrial physicians. Certainly few employers could be made to see the point of hiring a physician one of whose main functions would be to send employees to other physicians whenever any medical attention other than first aid is needed.

There could be other undesirable consequences if the dictates of the American Medical Association were to be followed. Not infrequently a worker who has been injured or has become ill prefers to receive treatment from the industrial physician. To oblige him to go elsewhere for treatment is to deny him the fundamental right of free choice of physician to the same extent as this right is denied when he is obliged to accept treatment from a physician chosen by his employer (as required under the workmen's compensation laws of many states). The divided resopnsibility, differences in opinion, and often conflicting interests between the industrial physician and the private practitioner frequently lead to unpleasant controversy and often operate to the disadvantage of the patient. The family doctor is usually unfamiliar with working conditions in the plants where his patients are employed and tends to accept without question statements made by a patient. This may lead him incorrectly to attribute symptoms to an occupational exposure or episode or to recommend a change of duty, a period of absence, or some other unwarranted procedure. Estimation of a worker's fitness to perform a specific job or to return to work following illness or injury can best be made by the industrial physician; nevertheless he will frequently find the family physician giving conflicting advice to the patient. These are but a few of the situations in which the industrial physician and the private practitioner may be at variance.

The American College of Surgeons disagrees with the American Medical Association in regard to the treatment of industrial injuries, stating that an adequate industrial medical service requires "efficient care of all industrial injuries and occupational diseases,"[2] as contrasted with first aid and referral to a private physician for further treatment as stipulated by the American Medical Association. In actual practice there are few if any industrial medical departments employing a full-time physician which restrict their therapeutic activities to first aid and the treatment of occupational diseases. Workmen's compensation laws hold employers legally responsible for providing medical treatment for em-

ployees who are injured or become ill in the course of their work. When a part-time or full-time industrial physician is in attendance he is ordinarily the one who renders the bulk of the treatment.

The industrial hygiene activities of physicians in the employ of an official or voluntary health agency or of an insurance company have been generally accepted as proper and as not being in conflict with practitioners of medicine. As a matter of fact there is a small number of highly trained industrial hygiene physicians who are in private practice. There are so few of these specialists that they are hardly in a position to raise a voice of protest against their main competitor, the governmental health agency. Physicians employed or retained by labor unions to render medical care to union members and their families have not been the subject of any serious controversy, at least in recent years.

It is a well known fact that, of disability among employed persons due to illness and injury, at least 90 per cent is attributed to causes not directly related to occupation. If, as the Chairman of the Council on Industrial Health of the American Medical Association has said,[4] one of the objectives of industrial medicine is "to reduce all loss of time, absenteeism and short work spans in industry the cause of which may be in any way related to health," it is incumbent upon the industrial physician to concern himself directly with the major cause of illness among workers, that is, the causes which are not directly related to the occupational environment. This does not necessarily mean that the physician employed by industry must undertake to render complete medical care to all employees and their families, although in certain instances this has been and is being done. It does mean, however, that methods must be found whereby divided responsibility for the health of employed persons can be eliminated and whereby the efforts of the physician practising within the plant can be better coördinated with those of his colleagues in private practice.

THE CHANGING ORDER IN MEDICINE

It is apparent even to the most casual observer that the entire structure of medical practice is undergoing a number of changes. The traditional fee-for-service solo practice is no longer able to satisfy the demands of a large part of the public or of a large number of physicians. The inadequacies of the older methods have been admirably presented by the Committee on Medicine and the Changing Order of the New York Academy of Medicine.[7] Outstanding among the newer developments have been first, the phenomenal growth of medical prepayment plans and, second, the extension of group practice.

Efforts on the part of employed persons to secure some measure of security against the financial burdens caused by illness go back to the days of the Friendly Societies in England and later to similar organizations in this country. Employee mutual benefit associations as we know them today originated about seventy years ago[8] and from their early days included the payment of benefits in the event of sickness or injury. It has been estimated that at the present time there are approximately 600 mutual benefit associations in the United States covering about a million and a half employees.[8] A number of labor unions have established sick benefit plans, the first in this country having been set up in 1859. The number of union members covered in this way has never been large and probably will diminish as other forms of sickness insurance become more popular. At the present time there are two forms of insurance against the costs of sickness which provide coverage for substantial numbers of employed persons. These are

the Blue Cross hospital service plans which had 25,000,000 subscribers in 1946, and group health, accident, hospital, and surgical plans which cover perhaps 10,000,000 subscribers.[8] In both instances the subscribers represent employed persons and their dependents. The National Industrial Conference Board found in 1946 that the costs of this type of insurance were borne entirely by the employer for nearly half of the employees covered.[9]

According to the latest available figures, medical care plans of the service type organized for employed groups number somewhere between 100 and 150, and cover approximately 500,000 employees and 100,000 dependents.[10] These service plans must be distinguished from the group health plans mentioned in the last paragraph which are of the cash indemnity type. The latter offer certain cash benefits in the event of disability due to illness or injury, while the former pay part or all of the costs charged by attending physicians. In most of these plans the premium payments are defrayed jointly by employer and employee, a few being financed entirely by the employee and a smaller number entirely by the employer. The number of persons covered by some form of health insurance indicates that not only the private practice of medicine but the practice of industrial medicine as well is being affected by the rapid extension of the health insurance movement.

When the many advantages of group practice are considered it is amazing that this form of medical practice has not been developed on a larger scale. There are, of course, many types of medical practice groups, but fundamentally they all represent a form of medical teamwork functioning for the benefit of both patient and physician. Since the future of industrial medicine is inseparable from that of medicine in general, it is natural to expect group practice to be applied to the former in at least the same degree as to the latter. The same principle applies to prepayment for medical care and to all other current developments in the practice of medicine.

INDUSTRIAL MEDICINE AS A SPECIALTY

Certification by a "specialty board" has become a fetish in American medicine. It cannot be denied that the motives which activated the creators of the system of certifying specialists were worthy and there is no doubt that standards of postgraduate medical education and of medical practice have in many ways been raised as a result of this movement. Nevertheless it has now begun to appear as though a Frankenstein has been created and its progenitors are showing signs of concern over what to do with this unruly monster. If the policy of giving preferential treatment in hospital appointments and salary bonuses in government jobs to possessors of the coveted specialty board certificates, then each branch of medicine must adopt the policy of certification in order to compete with other branches for new medical talent. In other words, if any specialty is to survive as such it must offer some mark of distinction which will set those physicians who have had extended education or training in some way apart from those who are presumably less well educated or trained.

In the specialties which have created certifying boards to date there has been no great difficulty in establishing the requirements for certification. This is due to the fact that the sphere of activity in the respective specialties had become pretty well fixed. The contrary is true in the case of industrial medicine. The functions of the industrial physician have not yet been determined, consequently there must inevitably be great difficulty in setting up standards for specialty certification.

Several organizations have shown active interest in the problem of industrial medicine as a specialty. Among these may be mentioned the U. S. Public Health Service, the American Academy of Occupational Medicine, the American Association of Industrial Physicians and Surgeons, and the American Medical Association. The Chairman of the Council on Industrial Health of the last named group has had the following to say on the subject [2]: "First of all, we are convinced that occupational medicine is a distinct specialty which can be defined. Secondly we believe that it is important that a certification board be established in this specialty. It will do much to elevate the standards of practice in the field of occupational medicine." Undoubtedly, as Dr. Seeger has stated, the field of occupational medicine can be defined. Unfortunately, up to the present time nobody has successfully tackled the job, although a few attempts have been made. That of the Council on Industrial Health of the American Medical Association is as follows [2]:

"The principal components of occupational medicine are:

"1. Health conservation.

The physician in industry is expected to maintain and improve health, fitness and productive capacity through physical, mental and emotional appraisals, job evaluation and placement, health counselling, health education and through the application of medical and psychiatric technics to industrial human relations.

"2. Medicine and surgery.

Medicine and surgery in industry deal with occupational diseases and surgery of trauma including disability evaluation, rehabilitation and medico-legal aspects, control of preventable illness, the industrial implication of the medical and surgical specialties and emergency care.

"3. Environmental Hygiene.

Environmental hygiene is concerned with the detection and control of occupational exposures, general plant sanitation and housekeeping, personal hygiene of workers, accident prevention, the application of regulatory codes and factory inspection laws.

"4. Administrative methods.

Administration includes medical department planning and operation, integration with related in-plant functions, maintenance of adequate records and statistics and correlation with community medical, hospital and health services."

Certainly the Council on Industrial Health is to be commended for having put into writing many of the important components which go into the practice of industrial medicine. Unfortunately, the terminology in several places tends to be somewhat vague, and there appear to be some important omissions. Just what is meant by "physical, mental, and emotional appraisals" is not entirely clear. What sorts of "medical and psychiatric technics" are referred to and how they are to be applied require further elucidation. It would appear that health conservation is to be achieved without diagnosis and treatment of disease. It is not stated whether the control of preventable illness is to be limited to diseases arising in the course of employment or is to include all preventable diseases. No doubt the Council will be more specific on some of these points as its thinking progresses and as it receives the comments of other interested persons.

The American College of Surgeons has defined the field of industrial medicine by stating that [3]:

"An adequate industrial medical service requires:

"1. A definitely organized plan for the medical service.

"2. A definitely designated staff of qualified physicians, surgeons, and attendants.

"3. Adequate emergency, dispensary, and hospital facilities.

"4. Preplacement and periodic physical examinations—to be made only by qualified medical examiners.

"5. Efficient care of all industrial injuries and occupational diseases.

"6. Reasonable first aid and advice for employees suffering from non-industrial injuries and illnesses while on duty. For further professional care such employees should be

referred to their own private or family physicians.

"7. Education of the employee in accident prevention and personal hygiene.

"8. Elimination or control of health hazards.

"9. Adequate medical records, accessibly filed in the medical department under responsible medical supervision.

"10. Supervision of plant sanitation and all health measures for employees by the physician or surgeon in charge.

"11. An ethical and coöperative relationship with the family physician.

"12. The use of approved hospitals."

If industrial medicine (or occupational medicine) were to embrace only those functions listed by the American Medical Association and the American College of Surgeons it would cover a tremendous range and diversity of activities: physical, mental, and emotional appraisals, job evaluation and placement, health counseling and education, application of medical and psychiatric techniques, occupational diseases, surgery of trauma, disability evaluation, rehabilitation, medicolegal matters, preventable illness, detection and control of occupational exposures, sanitation, personal hygiene, accident prevention, planning and administration, records and statistics, community correlation, physical examinations, first aid. Obviously no one individual, without an inordinately long period of training, could become expert in such a variety of subjects. Before specialty certification in industrial medicine can be established, it will be necessary to decide which items in the above list must be mastered by the candidate.

An essential corollary to the setting up of specialty certification is the provision of facilities for graduate and postgraduate training. At the present time such facilities both for didactic instruction and field training are quite limited, but there are indications of growth. The task of the educator is made difficult first, by the great variety of subjects he must cover and second, by the fact that there is no unanimity as to what subjects he should teach. There is a definite need for some agreement among educators as to the basic content of curricula designed to train specialists in industrial medicine. Until the field becomes better defined, the combination of training in internal medicine, traumatic surgery, and public health are suggested as desirable for an industrial physician.

A PATTERN FOR INDUSTRIAL MEDICINE

The statement that "the present is pregnant of the future" is as true today as it was when originally made by Leibnitz some 250 years ago. This being the case, one has but to examine the present situation in medicine in order to get a pretty good idea of probable future developments. Most significant among current trends is increased utilization of insurance methods for budgeting the costs of illness. A second important development is that of group medical practice. In general, the tendency is to plan for medical care rather than to trust to chance that illness will not occur. Preventive medicine, based on periodic examinations and early diagnosis, is commanding renewed interest.

Working people have learned that through collective action they are able to secure benefits, not only in wages and working conditions, but also in connection with medical care, which as individuals they might not be able to obtain. Both they and their employers have recognized that the employed group constitutes a suitable and convenient unit to which insurance against the costs of sickness can be applied. Employers in increasing numbers are appreciating the advantage of assisting their employees in maintaining health and in securing medical care. Proof of these statements is found in the phenomenal growth among employed persons of Blue Cross plans and of so-called group health and accident insurance,

with employers frequently bearing the cost entirely or in part.

The pattern which appears to be evolving in medicine is based on prepayment methods of defraying costs and group practice for providing service. This pattern is not new in the field of industrial medicine. A successful industrial prepayment medical plan has been operated by the Tennessee Coal, Iron and Railroad Company in Birmingham, Alabama, since 1913. A recent report [6] indicates that this plan provides complete medical care for 33,000 employees and 120,000 dependents. Care is provided at the place of work, in the home, hospital, or clinic, by a medical practice group of 75 physicians, 12 dentists, and 111 registered graduate nurses. The costs are shared jointly by employer and employee. A similar plan has been serving the employees (and their dependents) of the Standard Oil Company of Louisiana at Baton Rouge since 1924, and during World War II a plan along the same lines was developed by the Kaiser-Permanente groups. At the present time there are well over one hundred prepayment medical care organizations which have had their origin in industrial corporations. Now that opposition on the part of organized medicine to the general principles of prepayment and group practice has been pretty well dissipated it is reasonable to expect that there will be significant developments along these lines.

Industry is interested in maintaining and improving the health of its employees as an essential in maximum production. Labor is interested in obtaining medical care of high quality at a cost within its means. The physician is interested in practising high quality medicine and in adequate remuneration for his efforts. The combination of prepayment and group practice would seem to offer great possibilities for achieving these goals. Under such a system the industrial physician will take care of those medical problems which can be most efficiently handled at the place of work, referring the more complicated cases to appropriate members of his medical group. The patient thus obtains the benefits of team work medicine without the disadvantages of divided responsibility. The illogical and undesirable situation of having one doctor responsible for illness resulting from work and another for non-industrial illness is eliminated. Small industrial plants can enjoy the same advantages as the larger ones by arranging for part-time services of a physician who belongs to a medical group. As long as physicians remain in control of the development of plans of the type indicated, they need have no fear of losing their independence or economic security. If, through negativism or lack of courage, they fail to assume constructive leadership, industrial medicine may find itself going backward instead of forward.

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Planning for the Chronically Ill*

Joint Statement of Recommendations by the American Hospital Association, American Medical Association, American Public Health Association, and American Public Welfare Association

INTRODUCTION

THE conquest of many of the acute communicable diseases has focused increasing attention on chronic diseases [1] as the major causes of death and disability. Numerous communities are now awakening to their responsibilities for the chronically ill. In eight states and at least four cities, action to meet the problem of chronic illness has already been taken or is in the planning stage.[2]

There is a great need for comprehensive planning to insure that the widespread interest in chronic disease is channeled into sound and effective activity. Such planning requires the mutual coöperation of the agencies and professions most vitally concerned with the problem. For this reason, representatives of the American Hospital Association, the American Medical Association, the American Public Health Association, and the American Public Welfare Association have considered the experience already accumulated and have prepared this statement as a guide in the development of community programs. Although planning to meet the economic needs of the chronically ill is of vital importance, primary consideration is given here to the health and medical aspects of the total problem, including prevention, research, treatment, and rehabilitation.

It is hoped that the general public, as well as legislators and members of the health and welfare professions, will find this statement a useful guide and stimulus to planning for the chronically ill.

EXTENT OF CHRONIC ILLNESS

Chronic illness affects nearly every family. It has been conservatively estimated that about 25 million persons, more than a sixth of the population, have a chronic disease.[3] Some 7 million of these have appreciable disability from their illness,[4] while 1½ million are invalids.[5] The most important of the chronic diseases are heart disease, arteriosclerosis, high blood pressure, nervous and mental disease, arthritis, kidney disease, tuberculosis, cancer, diabetes, and asthma.[6] Because special provisions have been made for patients with tuberculosis and mental disease, they are not included in the scope of this statement.

Each year chronic diseases cause nearly a million deaths, and are responsible for the loss of almost a billion days from productive activity.[3] Appropriate action can prevent much of this staggering loss to our economy.

Although the prevalence of chronic diseases increases with age, and the progressive aging of our population is one of the factors responsible for the growing importance of the problem, it

* This report has been approved by the A.P.H.A. Committee on Administrative Practice, upon recommendation of the Subcommittee on Medical Care, and approved by the Executive Board of the A.P.H.A. It has been adopted as an Official Statement of the four associations.

must be borne in mind that chronic illness occurs at all ages. Fully one-half of the chronically ill are below the age of 45, and 16 per cent of them are under 25. More than three-quarters are persons in the productive years from 15 to 64.[3]

Chronic illnesses in childhood and adolescence are particularly important because they influence the period of growth as well as the entire period of adult life. They may have serious effects on the emotional development and social adjustment as well as the education of their young victims.

PREVENTION

The basic approach to chronic disease must be preventive. Otherwise the problems created by chronic diseases will grow larger with time, and the hope of any substantial decline in their incidence and severity will be postponed for many years.

There is a need to intensify health department programs to control chronic communicable diseases such as tuberculosis, syphilis, hookworm, and malaria. Accident prevention programs—in industry, on the farm, and in the home—should be greatly expanded to reduce the incidence of physical handicaps.

The promotion of optimal health throughout life is an important factor in the prevention of chronic illness. Child and school health programs need to be strengthened. Wide expansion of nutrition, mental health, and housing programs can have important effects in decreasing the incidence of chronic illness.

The success of programs to conserve the health of infants and children suggests the possibility of achieving effective health programs directed to adolescents as well as adults. The health programs of our high schools and colleges, including medical examinations and correction of defects, physical fitness and recreational programs, and health education require intensive development.

The periodic medical examination of apparently well persons needs to be explored on a new basis, including selective laboratory and clinical examinations chosen for particular age, sex, geographical, and occupational groups. These include serology, chest x-ray, urinalysis, electrocardiography, ophthalmoscopic and other examinations.[7]

Industry and labor can play an important constructive role in this connection by encouraging health examinations of employees, including laboratory procedures, on a much larger scale than at present.

The recent development of special phases of the health examination, particularly in the fields of tuberculosis control and cancer detection, is especially noteworthy. The great interest shown by the medical profession and the public in chest x-ray surveys and in the establishment of diagnostic centers to examine apparently well persons for early signs of cancer represents a distinct advance in preventive medicine. It may well initiate a basic shift in emphasis in the medical care of adults comparable to that which has occurred in obstetrics and pediatrics, in which preventive supervision and examination of presumably well persons is a major requirement of good medical practice. There is a need to explore the practical possibilities of preventive examinations to discover all possible disease, making full use of the diagnostic aids developed by modern medical technology.

RESEARCH

Further advances in the prevention as well as the treatment of many chronic diseases are dependent on research. Although a good deal of research is now being carried on in chronic diseases, only a fraction of the total need is being met.

War experience in medical research

has made it clear that we must broaden our vision and think in terms of research planned and organized on a much larger scale than any now contemplated. This requires the training and support of a much larger corps of medical scientists, and the development of teams of research workers to carry forward coördinated programs. The greatest emphasis must be placed on those diseases which are the most important causes of death and disability, such as heart disease, high blood pressure, arteriosclerosis, arthritis, kidney disease, cancer, diabetes, and asthma.

Research institutes in chronic diseases, associated with clinical facilities, may well become the basic units of such a program. In New York City, the research services of the Goldwater Memorial Hospital have carried on important research in kidney disease, arteriosclerosis, malaria, and cirrhosis of the liver.[8] In Illinois, the State Commission on the Care of Chronically Ill Persons is considering the advisability of developing a state supported university research institute for the study of chronic illness which would, in addition to suitable research facilities, provide beds for 200 patients and an outpatient service for 15,000 patients a year.[9] The National Institute of Health is formulating plans for intensive laboratory and clinical research in heart disease, geriatrics, cancer, and mental disease.

There is a great need for administrative research, for more precise information on methods of providing the necessary services for the chronically ill. Basic research on some of the administrative problems is already being undertaken,[10] but the field is a relatively new one and requires intensive study and development.

Research is also necessary in the social and psychological aspects of chronic illness. The influence of these factors in the development of specific chronic diseases needs to be more fully determined, while the effect of chronic illness on the individual's social relationships needs further study.

MEDICAL CARE

In the past, the approach to chronic illness has been primarily concerned with institutional care for advanced stages of disease. There is need for a new orientation which places major emphasis on the early stages of chronic illness with a view to preventing or at least delaying the progress of the disease process.

Diagnosis and treatment of illness at its inception is essential to the control of chronic disease. Competent medical supervision, if brought into play early enough, can have an important preventive effect. The most dramatic expression of this fact is found in cancer control, where diagnosis of early symptoms and prompt treatment may be a life-saving measure. Early diagnosis and proper management of diabetes prevents the serious complications of infection, gangrene, and coma. Similarly, early diagnosis and treatment may prevent complications or prolong the lives of persons with heart disease, hypertension, rheumatic fever, peptic ulcer, and other chronic diseases.

The barriers to early competent diagnosis and treatment must be removed. This requires the construction of hospital and laboratory facilities to cover all our communities, with coordination of facilities to insure a maximum of diagnostic and therapeutic effectiveness for the individual patient. Health and medical agencies need to plan to fill the great needs for personnel as rapidly as possible. Means must be found to remove the basic economic barriers to early diagnosis and therapy.

Health departments, which have carried on excellent educational activities in communicable disease, should turn in increasing numbers to the larger field of chronic illness and teach

the public the facts about heart disease, cancer, diabetes, and other chronic diseases, with special emphasis on early signs and symptoms and the importance of early and continued medical supervision.

The concept of medical care must be broadened to include the social factors which play a vital role in the progress of chronic illness. Physicians have learned, for example, that it is not enough to cure a patient with minimal tuberculosis and send him back into the community. On the contrary, he must be observed carefully over a long period of time for signs of reactivation of the disease process. Even more important, the physician must draw on community resources in order to change the patient's environment to prevent breakdown. If the patient's previous occupation called for strenuous physical exertion, he should be retrained for office work or some other light occupation so that he can live with his tuberculosis or other chronic disease. Occupational retraining and job placement are essential therapeutic and preventive measures.

Several general considerations should be borne in mind in planning to provide adequate medical care for the chronically ill.

First, the care of the chronically ill is inseparable from general medical care. While it presents certain special aspects, it cannot be medically isolated without running serious dangers of deterioration of quality of care and medical stagnation.

Second, major emphasis must be given to coördination and integration of services. The person who is chronically ill will receive the type of care which he specifically needs only if provision has been made for the highest possible degree of coördination. Since the medical condition of the chronically ill person is not static but changes with time, it is essential to develop smoothly operating mechanisms for referral from one type of care to another.

Third, facilities for the care of the chronically ill should be planned for the community as a whole and not for the indigent alone. Chronic disease strikes all sections of the population, and the lack of facilities is as great for those who are able to pay as for those who are not. The facilities for chronic disease should be community institutions serving all sections of the population. They will in this way achieve a greater degree of financial stability because of the additional income from those able to pay, and will be able to furnish a higher quality of care.

Fourth, the services and facilities necessary for the medical care of the chronically ill require considerable and continuing financial expenditures in order to maintain the quantity and quality of care offered. Good medical care for chronic illness cannot be purchased on an "economy" basis.

Fifth, and most important, the goal of medical care is to maintain and restore the chronically ill as independent and self-supporting members of the community. Major emphasis should be placed on home and office care, with hospital care, convalescent care, and rehabilitation serving where possible to return the chronically ill to productive community life, and with nursing home facilities providing for those whose medical condition is such that they cannot remain in their home environment.

HOME CARE

The majority of persons who are chronically ill can best be cared for in home, office, and clinic.

It is unwise as well as impractical to consider a separate home, office, or clinic service for the chronically ill; their needs are best met by inclusion in the general community medical care program.

Ready access to diagnostic and specialist service is essential to adequate care for chronic diseases, since many of them are difficult to diagnose and treat.

One of the most pressing needs is for an expansion of public health nursing service to provide bedside and other nursing services for the chronically ill. Most rural communities and small cities do not have sufficient public health nurses to provide adequate bedside nursing care. Some of the larger cities have well organized bedside nursing programs, but even here the number of nurses is generally below the estimated minimum of one nurse per 2,000 persons to carry out all public health nursing activities including bedside care.[11] In addition to increasing the number of public health nurses, there is need to train them to provide valuable assistance to physicians in the time-consuming task of educating the individual patient in the proper understanding and management of his chronic illness.

Much wider use should be made of practical nurses and nurses' aides, working under the supervision of the public health nurse, for duties which do not require the training and experience of a graduate nurse.

Housekeeper service should be widely encouraged; there has already accumulated ample experience to show the value of the visiting housekeeper in the home care of chronic illness.[12] Housekeeper service performs the important social function of enabling the chronically ill patient to remain at home, and has an economic value in helping to reduce the need for expensive institutional facilities.

Other measures which enable chronically ill persons to be cared for at home include improved housing, supervised boarding homes, medical-social service, recreational and occupational therapy, and vocational rehabilitation. Social security measures to maintain income such as disability insurance, old-age insurance, and public assistance are likewise of vital importance.

HOSPITAL CARE

The large number of chronically ill persons in general hospitals who require long-term care represents a serious problem to hospital administrators.[13] The general hospital as at present constituted is often unsuited to the care of long-term patients, since it is geared primarily to the therapeutic and general requirements of the acutely ill. It may lack adequate departments for physiotherapy, occupational therapy, and rehabilitation, as well as sun porches, recreational facilities, educational facilities for children, and an understanding of the social and psychological needs of the chronically ill.

The average long-term patient requires less costly care than that provided in the acute general hospital.[14] To continue to care for the long-term patient in the acute general hospital is wasteful; it provides care which is more expensive than he actually needs, and which is often unsuited to his requirements.

The construction of hospital facilities for the chronically ill has been encouraged by the passage of the Hospital Survey and Construction Act, which provides federal aid for such facilities up to a maximum of two beds per 1,000 population.[15]

There is already evident a tendency in some localities to build chronic disease hospitals in areas remote from the medical center and the general hospital and with no relation to them. This trend unfortunately follows the pattern already laid down in the construction of our tuberculosis and mental hospitals, a pattern which has resulted in many instances in the medical isolation and stagnation of these special institutions.

Hospital facilities for long-term illness should be built in the very closest re-

lation to teaching centers and general hospitals.

The specialized chronic disease hospital is suitable in large cities, where it can be located on the grounds of or very closely related to a medical school or teaching general hospital. Special consideration should be given to planning the facilities for children who are chronically ill. While an official or voluntary organization may be responsible for the construction and maintenance costs, the medical school should provide the attending and resident staff and utilize the facilities for research and medical education in chronic disease.

It is important that the specialized chronic disease hospital serve as the consultation center for chronic disease in its medical service region.[16] It should maintain formal professional affiliation with general hospitals in the region that care for chronic patients, in order to provide consultation and teaching visits from the center to the general hospitals as well as the referral of patients to the center for special study.

Most patients with chronic illness who require hospitalization are best cared for in a unit of the general hospital especially designed to meet their needs. This arrangement encourages patients to seek and use care since it is near their homes, families, and friends; makes available to them the existing facilities of general hospitals; provides opportunity to internes, nurses, and staff for experience and teaching in chronic disease; avoids expensive duplication of existing general hospital facilities; and affords the most ready means of transfer to and from the acute and chronic disease sections of the hospital when needed. Further, it allows for greater flexibility in hospital planning by making it possible for future, unforeseen shifts in the relative proportions of patients with acute and chronic diseases to be met by changing the designated use of either chronic or acute beds in the same hospitals.

Many advantages of this plan would be lost if the chronically ill were simply intermingled with all other patients in general hospitals. The provision of a special wing or floor devoted to long-term patients insures that the special needs and problems of chronic disease are not lost sight of in competition with the more urgent and dramatic needs of the acutely ill. It makes possible the planning of the special unit in conformity with its special purpose, both as to architecture and staff. It makes it easier to provide occupational and recreational therapy, special physical therapy, rehabilitation and other services essential to the care of long-term patients. It facilitates a more economical use of nursing personnel, the utilization of a larger proportion of attendants, and less intensive medical staff attendance than is needed in the section of the hospital devoted to patients with acute illnesses.

Under no circumstances should chronic disease hospitals or units be limited to the indigent. The lack of facilities is felt by all sections of the population. High standards will be maintained most effectively if the facilities are geared to meet the requirements of the entire community. Also, the admission of patients who are able to pay will reduce the need for tax funds. It must be recognized, however, that prolonged illness exhausts the financial resources of many patients, necessitating payment from tax funds for their care.

CARE IN NURSING HOMES

Chronically ill persons who need active and continuous medical care should be treated in a hospital. On the other hand, there are many chronically ill persons who are more or less disabled by their illness, whose requirements for care can be met by practical nurses and attendants with medical and nursing

supervision, and who cannot or should not remain at home. Care for such persons should be provided in nursing homes.

The following example may make the difference clear. A person who has suffered a cerebral hemorrhage with paralysis of one side of his body requires hospital care. This care will extend over a period of weeks and months, during which time he will receive intensive physical therapy to restore the maximum possible use of his muscular system. When no further improvement can be obtained by medical treatment, and he is left with a good deal of disability which makes it impossible for him to be cared for at home, he is eligible for care in a nursing home.

Nursing homes, both private and public, should be brought under state licensure laws in which provision is made for minimum standards and regular inspection. The minimum standards should require continuing medical supervision, including complete medical examinations of patients prior to admission to the nursing home and follow-up examinations at definite intervals, as well as physician visits on a regular basis and on call. The standards should call for a sufficient number of practical nurses and attendants to meet the full needs of the patients. They should provide for at least one full-time graduate nurse in charge of nursing care.[17] The standards should require facilities for recreation and occupational therapy, for a maximum of privacy and individual attention, and for cheerful and homelike surroundings. Construction should meet adequate standards of safety and sanitation.[18]

Private Nursing Homes

Experience has demonstrated that improvement in the quality of private nursing homes cannot be obtained merely by passage of a licensure law. The power to inspect and license nursing homes carries with it the responsibility for carrying on an intensive educational campaign, working with the individual nursing homes to improve the care given. The device of placing each new nursing home on a six month probationary period, during which time there is a great deal of educational assistance from the licensing agency, has been demonstrated to be an effective method of raising standards.[19]

It is suggested that wherever possible, the quality of medical and nursing supervision can be greatly improved through arrangement with the medical board of a nearby hospital to provide the necessary medical services.

One of the most serious drawbacks to adequate care by private nursing homes is the low payments made by welfare agencies for clients requiring nursing home care. A sharp upward revision of payments by welfare agencies, to bring them up to the actual cost of care, is an indispensable prerequisite to raising standards. At the federal and state levels, liberalization or elimination of the ceiling on payments for public assistants clients is indicated.

Public Nursing Homes

The realization that a large proportion of the population of county homes or almshouses consists of chronically ill adults has led to a widespread movement to convert them into public nursing homes.

It is clear that such conversion does not make the almshouse a chronic disease hospital, but rather a nursing home for the chronically ill.

County homes should be converted into public nursing homes only if their physical facilities are adequate, if they are within reasonable distance of general hospitals with which close medical relationships are maintained, and if the responsible authorities are prepared to meet the minimum standards described previously: namely, adequate medical

and graduate nursing supervision; sufficient personnel to meet the full needs of the patients, including medical-social service if possible; provision for privacy, a cheerful and homelike atmosphere, recreational and occupational therapy; and construction which meets safety and sanitation requirements. Many county homes cannot meet these conditions and should therefore not be considered for conversion.

It is suggested that conversion be planned on a state-wide basis, with the most careful evaluation of the suitability of individual almshouses for conversion. Financial and technical assistance by the State to localities planning conversion will make it possible to achieve higher standards of care. Public nursing homes should be included in the provisions of nursing home licensure laws.

A factor which will help obtain increased community interest, better administration, and higher quality care in public nursing homes is the admission of patients able to pay part or all of the cost of care. There is a considerable demand for public nursing home care on the part of patients able to pay. By opening its facilities to such patients the public nursing home will not only improve its financial position but will perhaps begin to free itself from the almshouse tradition and serve as a public facility for the entire community.

The Social Security Act should be amended to allow federal matching to states for assistance to patients who wish to enter public medical institutions, including nursing homes, that meet adequate standards. Payment for nursing care in public as well as private homes should be commensurate with the actual cost.

New Institutions

The shortage of institutions for nursing home care of the chronically ill cannot be met by present facilities or by the conversion of county homes. There is a definite need for new construction.

It is recommended that voluntary and governmental general hospitals which have chronic disease pavilions give serious consideration to establishing nursing home facilities for the chronically ill. These facilities should be built on the grounds of the general hospital or within a reasonable distance. There should be close administrative, medical, and nursing relationships between the hospital and the nursing home.

The specialized chronic disease hospitals located in teaching centers should likewise maintain nursing homes which can be utilized for research and training and will set standards of quality of nursing home care.

The construction of new institutions should be closely integrated with state plans for reconversion of public homes and utilization of private nursing homes in order to prevent an overabundance of facilities in some areas and lack of facilities in others.

CONVALESCENCE AND REHABILITATION

Undoubtedly the most neglected aspect of chronic illness is that of convalescence and rehabilitation.

Only recently has there been recognition of the fact that convalescent care is an important feature of the care of the chronically ill. Chronic diseases often run a course of many years, with periods of relative well-being alternating with periods of illness. Following a flare-up of illness adequate convalescent care may lead to complete or partial rehabilitation, and may help delay the progress of the underlying chronic disease. Such convalescent care undoubtedly conserves hospital beds and performs important therapeutic and preventive functions. Examples of chronically ill persons requiring convalescent care would include those recovering from a period of heart failure,

an attack of acute rheumatic fever, or a flare-up of arthritis. Then there are persons who have a chronic illness such as diabetes or heart disease, and develop pneumonia or some other acute illness, and need convalescent care after recovery from the acute illness.[20]

There has been a large growth of convalescent homes for children with rheumatic heart disease and other crippling conditions. It is essential that such convalescent homes be located near enough to general hospitals to permit close professional relationships and adequate medical supervision.

Convalescent homes for adults have never been developed to any appreciable extent in the United States. Most convalescent care for adults is now provided in nursing homes which also care for non-convalescent patients. On the whole, there has been insufficient appreciation of the value of convalescent care and rehabilitation in the care of the chronically ill.

Recent experience with planned convalescence and rehabilitation in the armed forces has demonstrated their great potential usefulness. By providing physical reconditioning, educational training, recreational activities, and vocational guidance, it was found possible to shorten the period of hospitalization, reduce the incidence of recurrences, and return a larger proportion of men to active duty.[21]

Planned convalescence and rehabilitation are particularly important in chronic disease. The chronically ill have to be made conscious of their limitations early in the course of the disease, and many of them must be retrained for new occupations so that they may stay within the limits of activity prescribed by their illness and yet maintain their economic independence.

Probably the first steps along these lines will be taken by university hospitals, some of which have already made plans for rehabilitation centers as an integral part of their medical program.

In 1943, Congress broadened the scope of the national rehabilitation program. As a result, state rehabilitation agencies were able to rehabilitate successfully nearly 42,000 persons in 1945. These were generally persons with long standing chronic impairments and illnesses—orthopedic disabilities, speech, hearing, and sight defects, poliomyelitis, tuberculosis, mental disease, heart disease, asthma, hernia, and other conditions.[22] That the need is still far from being met is indicated by the fact that the estimated backlog of persons in need of and entitled to such service is between 1½ and 2 millions.[23]

Of the 42,000 disabled persons who were successfully rehabilitated in 1945, nearly 79 per cent were unemployed at the time of applying for rehabilitation service, and 18 per cent had never been employed. The average yearly income before rehabilitation, including those who received assistance from public or private sources, was $288. The average annual wage after rehabilitation was $1,764. The total income of the group was increased by rehabilitation from 12 million dollars a year to 74 million, a sixfold increase.

In the past, many of the disabled have had to be supported by public or private assistance at a cost up to $500 a person each year. Vocational rehabilitation costs an average of only $300 a person, and this cost is not repeated.[22] On the contrary, rehabilitation changes the individual into a self-sustaining productive member of the community. It is clear that rehabilitation is economically and socially sound.

The results achieved with long standing chronic impairments and diseases point up the great potentialities of rehabilitation instituted early in the course of chronic illness.

COÖRDINATION OF SERVICES

The problem of chronic disease pre-

sents many aspects—prevention, research, medical care in home, hospital and nursing home, and convalescence and rehabilitation.

Undue emphasis on any one aspect would be unwise, uneconomical, and ineffectual. For example, to concentrate on the provision of medical care without paying serious attention to prevention and research would postpone for many years any basic attack on the problem. On the other hand, it is impossible to focus sole attention on research because of the very urgent need for medical care. Likewise, to provide hospital beds for chronic disease without making nursing home facilities available would result in many beds being occupied by patients who do not need hospital care. Too great an emphasis on nursing homes would deprive many patients of the specialized hospital care which is necessary for their improvement. Failure to plan adequately for home care or for convalescent care and rehabilitation would defeat the purpose of the program—to maintain and restore the individual as a self-supporting productive member of his community.

There is a great need for coöperation and coördination of the numerous agencies concerned with chronic disease: health, welfare, and education departments, hospitals, medical societies, medical schools, social agencies, rehabilitation services, nursing homes, etc. In some communities this coördination has been achieved through the establishment of central planning and coördinating bodies which study the various aspects of the problem, make the facts known to authorities and the public, stimulate needed services, assist in securing necessary facilities, and act as information centers for patients, physicians, and health and social agencies.[24]

The total problem of chronic disease is not a series of separate problems which can be solved one by one, but rather a complex of interrelated problems which require simultaneous solution. It is recommended, therefore, that coördinated and comprehensive planning be undertaken at all levels in order to achieve effective action to meet the challenge of chronic illness.

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AMERICAN PUBLIC HEALTH ASSOCIATION

Uses of Statistical Data in State Health Departments*

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STATISTICAL work being carried on in state health departments in 1940 was studied by Mountin and Flook, several years ago, for the preparation of a revised edition of *Public Health Bulletin No. 184*. Their findings indicate that all state health departments were making simple tabulations of vital statistics data; many were prepared to supply certain statistical information upon request; and about one-third were routinely preparing certain descriptive material for use by other divisions, such as lists of tuberculosis deaths. The authors of this report were, for various reasons, forced to conclude, however, that "few states go beyond their primary duty of collecting and preserving records and preparing more or less standard tabulations."[1]

In the few years since that study, many state health departments have taken steps to expand their statistical services. Much of this expansion has been stimulated by increased federal and state activities in special fields, such as tuberculosis control, venereal disease control, and the Emergency Maternity and Infant Care program.

In April, 1946, information on statistical services now being rendered and the types of administrative organization for giving these services, was obtained by questionnaire from 42 state health departments.† All 42 states, as in the past, were making more or less standard tabulations of data from birth and death certificates. Recent expansion of statistical activities into new fields was evident, however, from the replies received. Health departments in 29 states reported statistical work in progress in the field of communicable diseases (including morbidity reports), 26 in tuberculosis control, 22 in venereal disease control, and 14 reported statistical work being carried on with data accumulated through the Emergency Maternity and Infant Care program. These, and other fields of statistical activity, with the numbers of states so engaged, are shown in Table 1. The nature and extent of statistical work in each of these categories varied widely. Activities which were reported in the field of communicable disease control for example, varied all the way from a simple weekly tabulation of notifiable diseases in some states to research by one state health department on the effect of ultra-violet irradiation on transmission of diseases due to filtrable viruses. Likewise, statistical work in tuberculosis control included a range of projects from the comparatively simple procedure of maintaining a central register of known cases to the scientific research required for the epidemiologic study of familial susceptibility to tuberculosis.

In general, the statistical work being conducted in state health departments falls in three classifications.

* Presented before the Vital Statistics Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 12, 1946.

† No reply was received from Connecticut, Georgia, Minnesota, Pennsylvania, Utah, and Wyoming.

TABLE 1

Statistical Activities Reported by 42 State Health Departments, April, 1946 *

Fields of Statistical Activity	*Number of states reporting activity*
Vital statistics (standard tabulations)	42
Communicable diseases (including morbidity reports)	29
Tuberculosis control	26
Venereal disease control	22
Emergency Maternity and Infant Care program	14
Dental health	7
Laboratory tests and procedures	7
Crippled children's services	6
Cancer	5
Special serologic surveys	5
Industrial hygiene	4
Hospital care surveys	2
Accidental deaths	2

* Information obtained from questionnaires sent each state health officer.

1. Simple tabulation of data collected routinely in the various divisions and services of the health department
2. Statistical analysis of data collected routinely
3. Independent investigation and research in specific problems relating to public health.

All state health departments are engaged in the first of these, that is, current tabulation of data collected routinely. In this category are such items as periodic activity reports, morbidity reports and tabulations of data on death certificates. Not all state health departments, however, are utilizing this information, by means of statistical analysis, for the full advantage of the various public health programs.

Very few state health departments are engaged in statistical research in specific fields—the third type of activity mentioned above. This type of work requires, in addition to specialists in the field concerned, the services of an expert statistician. Outstanding work of this last type was reported from 3 states. Massachusetts is carrying on cytologic research in the evaluation of the vaginal smear technique for the diagnosis of uterine cancer in symptom-free women, and a study of the genetic-environmental factors pertaining to cancer. This department in addition conducts studies on the relation of industrial environment to health, and a study of fluorine as a preventive of dental caries. The New York State Health Department is also studying the effect of fluorine on the incidence of dental caries, and the effect of ultra-violet irradiation on the transmission of diseases due to filtrable viruses, which was mentioned above. In Tennessee, research has been carried on since 1931 in the epidemiology of tuberculosis, with intensive study of such factors as the prevalence of infection in racial groups, morbidity and mortality in households, familial susceptibility to tuberculosis, and the significance of sensitivity to histoplasmin and tuberculin.

Research of this type, obviously, depends upon the availability of highly trained personnel. While many state health departments may be unable to carry on a research program on a permanent basis, all state health departments can obtain personnel capable of analyzing the information collected routinely for the evaluation of programs and program planning. This activity is, perhaps, the primary purpose of a statistical unit in a state health department.

For many years, state health departments have been publishing tabulations of data from birth and death certificates. Such tabulations frequently fill several

TABLE 2

Whooping Cough Cases and Deaths with Average Annual Rates Per 100,000 Population and Case Fatality Rates, for Certain Ages, Tennessee, 1938–1942 *

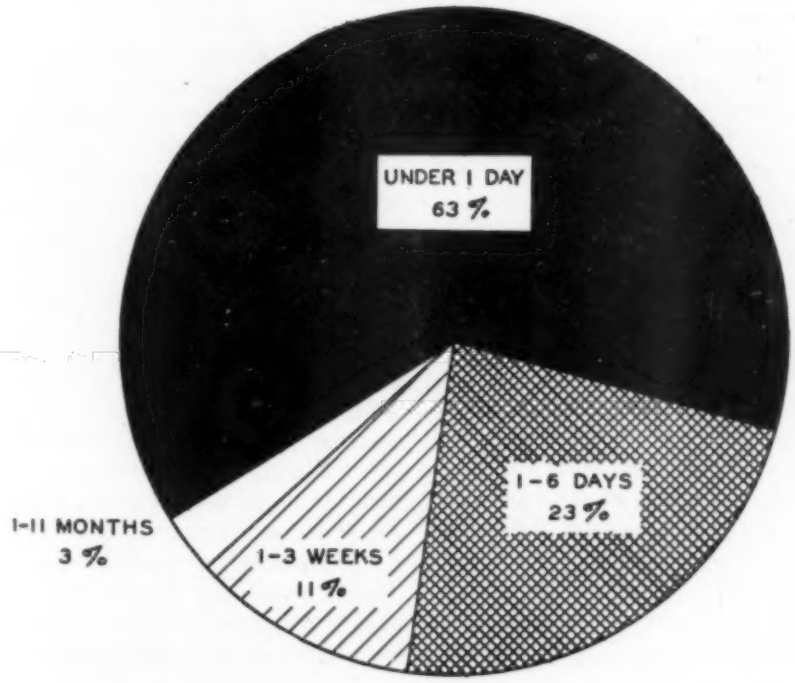
Age in years	Cases		Deaths		
	Number	Average annual rate	Number	Average annual rate	Case fatality Per cent
Total	11,168	76.6	657	4.5	5.9
Under 1	1,703	639.4	410	153.9	24.1
1	1,120	398.5	153	54.4	13.7
2	1,294	460.4	46	16.4	3.6
3	1,141	406.0	21	7.5	1.8
4	1,066	379.3	5	1.8	0.5
Under 5, total	6,324	454.8	635	45.7	10.0
5–9	3,632	255.9	16	1.1	0.4
10 and over	872	7.4	5	0.2	0.6
Unknown	340		1		

* Data from *Tennessee Vital Statistics* and *Tennessee Morbidity Statistics* for each of the years, 1938–1942. Case rates and death rates are based on 1940 Census populations.

CHART 1

PERCENTAGE DISTRIBUTION BY AGE OF INFANT DEATHS FROM PREMATURITY

MISSISSIPPI, 1943



pages in annual departmental reports, where they undoubtedly rest in peace. When the data are subjected to even the simplest type of statistical analysis, however, they can be made to answer questions pertinent to specific health problems. One example of this use of statistical data is in connection with the planning of a whooping cough immunization program. In the early part of 1942, the Tennessee Department of Public Health, with the assistance of the Commonwealth Fund, began making plans for an active program of immunization against whooping cough. The disease had been recognized as constituting a major health problem among young children and with the development of an effective vaccine it had become possible to talk in terms of prevention. Analysis of the data on mortality and morbidity in the area indicated the age groups in which immunization was most needed. Table 2 shows that whooping cough case rates, death rates, and case fatality rates were very high for children under 5 years of age. Moreover, the greatest risk of death was for very young children. Of all those dying of whooping cough in Tennessee in the 5 year period 1938-1942, 93 per cent were less than 3 years of age, 86 per cent were less than 2, and 62 per cent, or nearly two-thirds, were less than 1 year of age. Hence, if the immunization program were to lower morbidity and mortality from whooping cough, vaccinations would have to be given as early in life as practicable and concentrated on the age group under 3 years of age. This was actually the program inaugurated.[2]

Another use of information currently obtained from vital statistics records is illustrated by a study of infant deaths, such as one prepared by the Mississippi State Board of Health. It was evident from this work that the various specific causes of death covered by the term "prematurity" were a challenge to medical and public health personnel. Of 2,774 deaths of infants under 1 year of age in Mississippi in 1943, 625 or 22.5 per cent were said to have died from "premature birth." Chart 1 shows that 63 per cent of these deaths occurred when the infant was less than 1 day old, and an additional 23 per cent occurred between the ages of 1 day and 1 week. Thus, 86 per cent of the deaths occurred in the first week of life. If the death rate in the age group under 1 year is to be reduced, therefore, emphasis must be placed first on the best possible care of mothers in the antepartum period, in order to prevent delivery before term, and on the best possible care of the immature new-born. Accordingly, with this in mind, the Mississippi State Board of Health, in 1945, held short wartime postgraduate courses in pediatrics and obstetrics which were attended by one physician out of every five in active practice in the state.[3] Another important phase of this program is the provision of incubators in county health departments throughout the state which are available for loan whenever needed for care of the new-born.

A third illustration has to do with the use of information from a different type of record. When many questions arose with regard to a need for modification of the school health program in Tennessee, several years ago, the existing public health service records were used as a basis of judgment.[4] Analysis was made of the findings on physical examinations recorded on the school health records of about 58,000 children in 6 counties. One of the many items considered was the result of vision tests. Study of vision tests at first examination showed a gradual increase in the incidence of visual defects from 2.3 per cent for 6 year old children to 6.9 per cent for 16 year olds. The data are given in Table 3 and Chart 2. It was also shown that the percentage of children found with visual defects for the first time was

TABLE 3

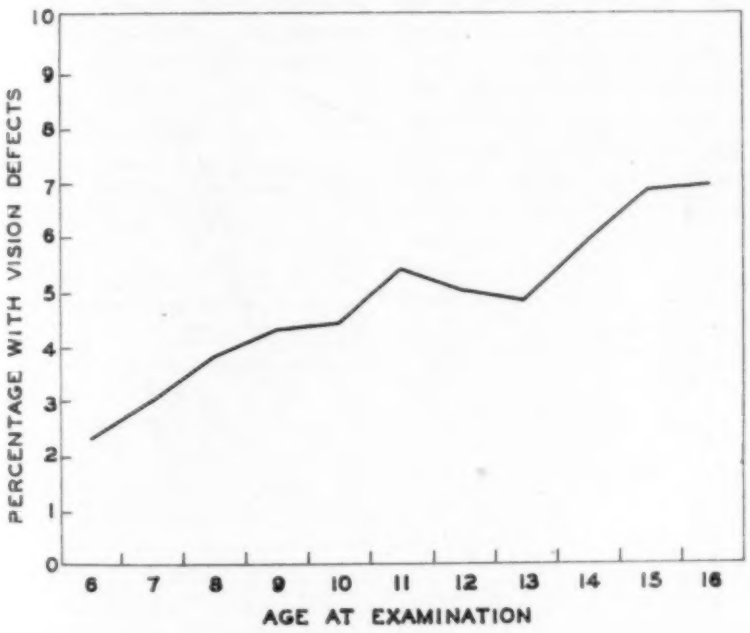
Percentage of School Children with Vision Defects at First Examination, By Age, 1930–1936 (Six Tennessee Counties) *

Age at examination	Children examined	Children with vision defects	
		Number	Per cent
Total	54,487	2,147	3.9
6	11,183	255	2.3
7	10,187	301	3.0
8	6,910	261	3.8
9	5,247	228	4.3
10	4,653	205	4.4
11	4,070	218	5.4
12	3,711	185	5.0
13	3,260	158	4.8
14	2,619	155	5.9
15	1,702	116	6.8
16	945	65	6.9

* From *School Health Services*, by Walker and Randolph.[4]

CHART 2

PERCENTAGE OF SCHOOL CHILDREN WITH VISION DEFECTS AT FIRST EXAMINATION, BY AGE



DATA ON SIX TENNESSEE COUNTIES, 1930-1936. FROM SCHOOL HEALTH SERVICES, BY WALKER AND RANDOLPH

practically the same on first, second, third, and fourth examinations. Since the attack rate of visual defects was fairly constant for all ages and since the prevalence of defects increased with age, the examination of children at any one time obviously would not discover all vision defects. For this reason, the authors concluded that although a first examination of school children would, for example, reveal the bulk of heart and lung defects, annual vision tests of

all children at all ages would be needed to detect visual defects as they occurred throughout the school years.

Studies such as these just described are needed for intelligent planning by health administrators and are the mark of the mature health department. There is evidence that public health officials now more than ever realize the need for statistical evaluation of work as it is being carried on in the various fields of public health. Some progress has already been made toward establishing the necessary administrative machinery for doing so. Ten states, of the 42 submitting information to the questionnaire described above, reported that they had centralized statistical units which could render statistical service to all divisions of the health department. These states were: California, Illinois, Indiana, Louisiana, Michigan, Mississippi, Oklahoma, Tennessee, Washington, and Wisconsin. Administrative organizations for statistical work in these 10 states differ in one important respect. Five departments have organized central statistical services which are administratively independent of registration of birth and death certificates. In these services, the chief statistician is directly responsible to the state health officer. The other 5 state health departments have organized bureaus (or divisions) of records and statistics which are divided into two sections, one for registration and one for tabulation and analysis. The ways in which these two types of organization are coördinated with other divisions of the health department have been described in detail by Linder.[5]

In addition to the 10 states with central statistical services already organized, six states reported in April, 1946 that they were planning to organize this type of service in the near future.

For the sound development of statistical organization in a state health department, one question is paramount: By means of what type of organization can the mass of public health data be most economically and efficiently utilized for the improvement of the whole public health program? When the public health administrator has answered this question satisfactorily, he then will be in a position to utilize to advantage the services that a well qualified statistician is equipped to give.

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Statistics in the Planning and Evaluation of Health Procedures*

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THE statistician is primarily engaged in the business of measuring and counting. Measurements must be made on a recognized scale, and counts on items classified by accepted criteria. Moreover, such measurements and counts are made on populations subject to numerous kinds of variation, and it is one of the chief aims of statistical method to subject these variations to some sort of orderly process. This is all axiomatic and would doubtless earn the somewhat bored agreement of most statisticians.

We are all familiar with the variability encountered in measuring biological characteristics, be they the heights of a group of children or the amounts of hemoglobin per liter of their blood. We can describe the variations we expect to find in counting individuals or their attributes, and we are at all times conscious of this variability. There is another type of variability not so continually present in our thinking: the variation in the reliability of the information on which our counts are based.

What would we think of a physicist who gave us a series of measurements of wave lengths of light, based partly on the use of an interferometer and partly on that of a meter stick, and who, moreover, threw all his results into one table without discrimination? We should be entirely justified in asking him to omit the latter group of readings, or at least to tabulate them separately, since their only effect on the more precise results would be to dilute them and to obscure the conclusions.

At the same time, we would not ask the physicist to use an interferometer to measure a group of babies. The added precision over the meter stick would not be worth the great deal of extra trouble; we should prefer a large number of measurements with the coarser instrument to a few highly refined observations for our purposes in this case, which would be the description of height characteristics of a population.

Variation in precision attaches to the different sorts of information gathered by statistical services. Some is subject to little misinterpretation and can be gathered by almost anyone with sufficient exactness to serve the purpose. This sort of information does not suffer from collection in large quantities, because it is not seriously stratified as to accuracy at different levels of information.

At the other end of the scale there is information so highly technical, so difficult to secure accurately, that only the most painstaking investigation will assure us of its reliability. This sort of information cannot be gathered anywhere, by anybody, with the same order of certainty. For best results, the data must be obtained from their most accurate source, no matter how limited, and they can only suffer if mixed with spurious figures.

* Presented before the Vital Statistics Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 12, 1946.

Along the middle of the scale of reliability is information which is perhaps not equally reliable at all sources, but which can be adjusted to some extent. In this way, an error introduced by the use of heterogeneous data may be compensated by the stability introduced through the use of a larger sample.

Quite properly, registration departments concern themselves with the most complete possible collection of certain items of information about people. The items are sorted and counted and any possible legitimate conclusions are drawn. Now these items of counted information range from the most indisputable of facts, through matters of informed opinion, to offhand guesses resting on foundations which are anything but secure. As long as we keep in mind which items fall into what categories, we are in no great danger; but we are at times inclined to forget.

Let us examine registration data in the light of a crude scale of reliability. On one hand, we have matters of fact yielding to no differences in interpretation—the fact of existence, for example. A person simply is here, or he is not, and there is very little room for argument. With proper diligence, plus considerable intelligence, we can keep a pretty fair record of how many people we have. We can also, with some accuracy, determine their sex, color, where they live, and (though less accurately) how old they are.

Items of this kind do not suffer by collection in large numbers, or not very much. There is little difference in their accuracy at different levels of reporting: life and death, male and female, Grand Boulevard and Hogan's Alley have about the same meaning for everybody. These are the sort of data which are most valuable when most nearly complete, because they are only very slightly tinged with qualitative error.

By their nature, these are the simple items of information, and we are not apt to think of them as wildly exciting. We have accepted without comment for many years the fact that in improving our completeness of registration we have made more and more valuable the basic demographic data which are reported with the highest accuracy. Now we have found that these data, when intelligently developed and used by a capable department of registration and analysis, are extraordinarily valuable not only to the administrator of a health department but to many other branches of government. Although development along these lines has been largely in urban areas, similar use should be possible and profitable in smaller and more rural departments.

As soon as we begin to depart from the clear concepts of existence, of birth and of death, we enter a hazier landscape where the edges of shadows are less sharply defined and distances are sometimes deceptive. The difficulties, for a while, are not great. We still deal with matters which are fairly clear and which are quite universally defined in the same manner. Some diseases would, for example, be diagnosed the same by almost any medical man and would, when so diagnosed, quite uniformly appear on a death certificate. But the difference between having a disease (in its clinical form, at least) and not having it is nowhere nearly as sharp as that between life and death, nor is even the clearest concept of a disease as well defined as is that of sex.

By no means are all disease entities distinctly defined, nor are those of most frequent occurrence necessarily the most sharply differentiated. If you doubt this, ask the next ten physicians you meet to tell you how they would distinguish mild influenza, clinically, from a severe cold. You need not expect too much unanimity even though they may have been graduated from the same school at about the same time. Conversely, the fact that there is general agreement on the

assumption that a disease is a disease and not possibly a few other things, does not mean that it is necessarily easy to establish a diagnosis. This may require special training and a host of diagnostic aids which are not at the call of all practitioners in all parts of the country.

Old Doctor Jones, who could enter a patient's room and know, after one glance at the tongue, the cause of the trouble, has unfortunately gone the way of many heroes of a simpler day. He had, after all, very few diseases to contend with and his tools of diagnosis, consisting largely of experience and common sense, were as good as those most other physicians had at their command. But the list of diseases has multiplied enormously, and old clinical entities are being bombed into two or more totally unrelated fragments on every hand. Observe what has happened in the field of the pneumonias, which we once happily divided into "lobar" and "broncho." Not only has lobar pneumonia disintegrated into a nestful of diseases, distinct at least from the viewpoints of bacteriology and epidemiology, but a host of formerly unsuspected agents is giving us atypical pneumonias, virus pneumonias, and what not. Worst of all, we cannot even hope to diagnose or distinguish them without x-rays and a modern virus laboratory.

It does not give us much specific information to lump all these entities into a group designated "other pneumonias," and it is obviously impossible to separate them without processes requiring special skills. In order to count something we must first identify it, and if its identification can be made only in special fields, then those are the only fields from which we can get reliable data. Adding a great number of items based on uncertain diagnostic methods to a small nucleus of well defined cases does not add to information, it hopelessly clouds any conclusions we might draw from the smaller group. Yet we are apt to prefer the larger number, perhaps because we unconsciously assign to it a combination of the precision of the smaller group and the statistical stability of the larger.

If we stop to think, we must realize that medical diagnosis is definitely stratified into many areas of reliability. It is higher in a university teaching hospital with a large, trained staff than in even a very good private hospital. The city man, to whom specialized diagnostic aids are readily accessible, will on the whole make more accurately refined diagnoses than will his equally able country colleague. In our accumulated mortality and morbidity data we make little effort to stratify our information in accord with its reliability, but this variable cannot but enter into any comparisons which may be made.

I do not believe that any of us would advocate abandoning the reporting of "causes of death." With all its faults, it does give us valuable information that we cannot well obtain elsewhere. But it is most important for us to realize the severe limitations on the information we can hope to get from universal reporting of causes. Most definitely, we cannot expect nation-wide figures to give us specialized information which should be based on highly refined studies. If the death or birth certificate includes questions which cannot be accurately answered in the absence of highly specialized knowledge, it does not follow that everyone who fills out such a certificate becomes thereby a qualified specialist. What it does mean is that the few answers made in full accord with the facts are snowed under by the great majority of replies made in the light of pure or relative ignorance. If, in addition, we try for "completeness" and insist that everyone whosoever shall make some sort of answer to the ques-

tion, we merely turn the snowstorm into a blizzard and insure the thorough blockading of all roads to knowledge.

The logical answer to this problem is to restrict special information to the results of special studies. These may be as inclusive as possible under limitations of money and of personnel, but must always primarily be as expert and as unbiased as it is possible to devise them. In settling technical problems, there is no substitute for technical investigations, for expert knowledge and skill.

The reporting of deaths from tuberculosis, if reasonably accurate, will give us some important information of a rather simple nature. It cannot answer many of the special questions which are of prime importance to the administrator as well as to the epidemiologist. Special studies made in clinical environments can settle only some aspects of the problems.

To get a full answer, the disease must be studied where and as it occurs; in the population itself. But the agency which deals with populations in the field, and with their disease problems, is precisely the health department. It is in best position to make continued studies of a group or area, to bring diagnostic aids into play, to use epidemiological and statistical methodology. This type of study can give clues to many things: What is the course of tuberculosis in the community? Who are the individuals most at risk of contracting clinical disease? Who are those to whom the limited clinical facilities can most effectively be extended? And, as a by-product, the general reporting of morbidity and mortality from tuberculosis in the area studied gains an exactness far superior to that in other areas.

It is most encouraging to see health departments set up studies of just this sort, in various fields. Naturally, the aims include quick and accurate answers to pressing administrative problems, but may and do range much farther than immediate practicability. It is obvious that such studies demand the most expert of statistical guidance and analysis; it is no surprise to see that health agencies interested in making them have also expert and efficient departments of statistics.

It is interesting to see that two of the most significant developments in recent years in the field of vital statistics derive their usefulness partly from a realization of the stratification of reliability of information. At one end of the scale, much more complete use is made of data which are inherently the most reliable in bulk. At the other, emphasis is laid on the analysis of information which, even though limited in amount, is as accurate as it can be made.

It will be interesting, in the future, to see whether it will be possible to devise means of better utilization of the mass of statistics lying in the center zone of reliability, that part lying between the extremes of mass accuracy and of the demand for highly specialized knowledge. This zone may, for all we know, be narrowing. It is conceivable that we shall be able to improve on the accuracy of much information which is now doubtful, and that the scope of our special studies will spread more and more to fill any remaining gap.

A Discussion of Bacteriological Standards for Dehydrated Foods*

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IN recent years there has been a growing interest on the part of consumers in the wholesomeness, quality, and nutritional value of the food products which they buy. The manufacture of raw products into forms ready for use makes it necessary for the consumer to rely on the integrity of the manufacturer, or on certain regulations, to be assured that the food product purchased is manufactured under such conditions as to present no public health hazard and that it is of such sanitary quality as to be eaten with confidence. In order to give such assurances it is necessary to establish some uniformity of operation and to express food qualities in a uniform manner. One way of accomplishing uniformity is to establish standards which will serve as a guide to the manufacturer and be informative to the consumer.

Standards have been established for certain foods and are proving their worth. The recent growth of the dehydrated foods industry and the appearance of new dehydrated products on the shelf make it seem desirable to determine the need of standards for these products. Several kinds of standards may be applied to a food product. Standards of identity and standards of quality apply to the physical and chemical make-up of the product and its acceptability as an article of food. They aid the consumer in purchasing more intelligently and in getting his money's worth. Bacteriological standards are somewhat different but they apply directly to the above standards and are important from a public health standpoint. Foods might meet all standards of quality and identity, and be of excellent nutritional value, yet be contaminated with pathogenic microörganisms and thus present a public health hazard. On the other hand pathogenic microörganisms may be absent, yet due to faulty manufacturing techniques the product may be teeming with bacteria which markedly affect the quality and general acceptability of the food. In establishing any standard these two phases of the problem must be taken into consideration.

Fortunately, dried and dehydrated foods have a remarkably clean bill of health from the standpoint of food poisoning and other infections. Nichols[1] points out, "On the whole, the public health record of dried foods is remarkably clear. The almost complete absence of food poisoning or infection cases in which dried foods have been involved indicates that they are among the safest forms of food . . . While but little work has been done on the survival of pathogenic bacteria (in dried foods) the indications are that danger from this respect is remote." This does not mean that dried foods should be considered safe under all conditions, but it points

* Presented before the Food and Nutrition Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 14, 1946.

to the fact that, as a rule, they can be accepted with confidence.

Such statements show that, if bacteriological standards are to be set up, the primary emphasis should be from a sanitary or operating standpoint, and secondly, from the standpoint of public health. It can be shown throughout the food industry that the growth of spoilage bacteria is detrimental to the quality of the final product. So close is the correlation between spoilage and the deterioration of quality that bacterial standards should be a part of any quality standard of dried foods, since it is often possible to explain the reason for poor condition by a bacteriological examination. Bacteriological examinations of such products not only give evidence of conditions that existed during the manufacture but also point the way toward proper control of the processes. Fitzgerald[2] states that, "The problem of establishing factory sanitation methods and standards is as important as the question of quality standards. If products ever become public health hazards, then standards will be imposed on the industry . . . Sanitation standards are, nevertheless, a necessary adjunct of any quality control program. The very best grading standards can be nullified by poor sanitary techniques." Clague[3] points out that "The mere presence of bacteria, yeasts, or molds on dried foods does not of itself constitute a spoilage hazard. Modern packaging is such that moisture may be kept from gaining access to dried foods, thus eliminating the danger of spoilage. So the principal value of the microbiological examination of dehydrated foods would be to determine the comparative cleanliness of the process used from the time the raw product enters the factory until the finished product reaches the consumer."

It is evident that any bacterial standards must have their roots in the sanitary controls over food manufacturing processes. In order to be assured of any uniformity of results from the microbiological standpoint there must be established as rigid a set of operating standards for plants that process foods as the standards established for the final products. This means that if bacterial standards are to be established for any food commodity there must also be established an accompanying set of suggested sanitary operating standards with which to meet these requirements. This does not necessarily mean plant supervision by an outside agency, but it does mean that some organized supervision in the plant is necesary in order to manufacture a high quality product. Good sanitary practice ought to come instinctively to a food handler, but, alas, it is found too infrequently and often only under the shadow of compulsion. Many public health control agencies find full-time employment in establishing good sanitary practices in places where it would seem natural to find them if for no other reason than the monetary return from efficiency. Sanborn[4] calls attention to the fact that " . . . First, food products prepared under unsanitary conditions are almost certain to contain filth, sometimes gross enough to affect flavor or appearance to the unaided eye, and always manifest to the microscopist. This may consist of mold or other microörganisms, insects or insect parts, rodent hairs or excreta —any or all of them," and further. "Bacteriology teaches that the heavier the initial infection, the more severe is the process requirement for sterilization. Infection at some insanitary point in the preparation line, therefore, may result in serious commercial spoilage or loss of quality due to more vigorous processing to overcome the heavier bacterial infestation." Many people have to learn the hard way that it costs money to be slipshod and unsanitary in food preparation.

Let us look at dried fruits, vegetables, eggs, and meat for a clearer picture of

the need for bacterial standards for such products. Some of the drying methods were developed before many of the principles of sanitation were established, and it is difficult to change them. Other methods have been developed with good sanitary practices in mind.

DRIED FRUITS

Dried fruits are contaminated with microörganisms when they leave the orchard, but they pick up additional infections as they are processed. Fortunately, as Nichols [1] points out, the high acid and low protein content of fruits make them unfavorable media for the growth of pathogenic bacteria. The infections are largely from yeasts and acid-tolerant spoilage bacteria. Phaff, et al.[5] describe the handling of prunes in drying and state that the water used in washing the prunes is recirculated over a long period of time and becomes heavily contaminated with microörganisms. This water may so heavily infect the prunes that washing with fresh water is insufficient to satisfactorily reduce the bacterial population. Other methods of operation may tend to further contaminate them. Even so, the use of germicides and dehydration yields a product with few live yeasts and molds. Mrak [6] discusses this phase of the drying problem and indicates that recontamination in handling after drying may result in considerable loss and undesirable changes in the fruit in storage. In some dried fruits gas fumigation may be used to control microörganisms. Whelton, et al.[7] elaborate on this phase.

The sun-drying of fruits has the disadvantage of bacterial contamination while fruit is exposed in the open without the killing effects of heat as found in mechanical dehydration. Moreover, certain fruits deteriorate when they are heated and sun-drying must be used. Except for accidental contamination by pathogens, dried fruits would seem to offer no public health hazard. Bacterial standards should be concerned largely with control of handling and storage.

DRIED VEGETABLES

Vegetables are non-acid and, therefore, are subject to the growth of most types of microörganisms. Hucker, et al.[8] report a study of food processing plants from the microbiological standpoint. They found that although blanching and other operations reduce the numbers of microörganisms, recontamination in processing may occur. They found that the dried food from nine of twelve vegetable dehydrating plants was contaminated with members of the coliform group, and that "in 80 per cent of the cases, presumptive tests could be secured for coliform organisms on the finished dehydrated vegetable just prior to final packing." Jones [9] shows that *Escherichia coli* organisms are killed during proper blanching of vegetables. This points to the fact that if *E. coli* is found in the finished product it is indicative of contamination during the final processing and handling. A definite need for bacterial standards in such products is indicated, since the presence of organisms of the coliform group have long been used as an index of cleanliness. Their presence in dehydrated vegetables would indicate unsanitary or poor operating conditions. Kitner and DeLay [10] tabulate the improvement in bacterial quality obtained in a vegetable dehydrating plant through changes in the sanitary practices and in general plant conditions. He shows that sanitary conditions in operation during manufacture are definitely reflected in the final product.

Jones [9] points out that enormous quantities of air are used in dehydrating vegetables and that the amount of contamination encountered depends largely upon the location of the plant and the types of bacteria found in the air. Good sanitary practice would require the filtration of the air used.

Jones further calls attention to the fact that high bacterial counts "not only lead to earlier spoilage upon rehydration of the products but they also suggest poor sanitary conditions and methods in the plant, and may lead to the rejection of the products by health authorities."

The overloading of dryer trays as reported by Vaughan and Kuneman [11] shows how bacteria may grow in the food during the actual dehydrating process, even to the point of souring before becoming dry. Light tray loading prevents this.

Kitner and DeLay,[10] Jones,[9] and Haines, et al.[12] point out that the viable bacterial counts of dehydrated vegetables decrease in storage. This shows that it is difficult to use the live count except as a control in actual plant operation. The direct microscopic examination of dehydrated products seems to be the only method which will reflect the general condition of handling and drying, and serve in establishing bacterial standards.

DRIED EGGS

The expansion of the dried egg industry has added these food products to many food commodities. More research work has been done on the bacteriology of these products than any other of the dried foods under discussion here. Liquid eggs constitute a splendid medium for the growth of bacteria. The sanitary quality of dried eggs is linked largely with the manner of handling the shell eggs and the liquid before it is dried. High bacteria counts in these products indicate poor operation or handling techniques. Not only is a product with an abnormally high bacterial count likely to be of poor edible quality but Stuart, et al.[13] have shown that egg powder of low sanitary quality does not hold up in storage.

The plate or viable bacterial count is not a true index of the bacterial quality of an egg powder. Johns and Bernard [14] point out that the survival of bacteria in egg powder is affected by such factors as type of drier, drying temperatures, rate of cooling, and length of storage. Stuart, et al.[15] demonstrated that the death rate of bacteria in normal egg powder in storage was influenced by the initial moisture content. The lower the initial moisture the more rapid the death rate. Stuart, et al.[16] show further that in powder of high sanitary quality the rate of bacterial death proceeds at a uniform logarithmic rate, while there is a secondary accelerated death rate in powders of low sanitary quality. These facts, therefore, make it evident that the viable bacterial count can be of little value in establishing bacterial standards unless a complete history of the sample can be furnished.

However, the direct microscopic bacterial count, which shows the dead as well as the living bacteria in the powder, is not markedly affected by such factors. Thus, a microscopic examination will indicate through the type and numbers of bacteria the general conditions of the plant during the manufacturing period. Bartram [17] found that in experimentally prepared dried eggs the viable count was of limited value as an index of quality. Lepper, Bartram, and Hillig [18] show that the direct microscopic examination together with the chemical determination of the products of bacterial fermentation, acetic, formic, and lactic acids, serve to indicate the quality of the final product.

So far as is known, no authenticated cases of food poisoning or other infections have been traced to dried eggs. But the fact that several types of *Salmonella* have been isolated from dried eggs makes it necessary to keep the public health aspect in view when dealing with possible bacterial standards. The presence of *Salmonella* in dried eggs, and the fact that *Salmonella* poisoning outbreaks have not been reported pre-

sents an interesting public health problem. Soloway, et al.[19] have shown that *Salmonella* may be isolated from shell eggs, from the shell especially when dirty, from the egg liquid in an egg breaking room, and in egg powder. Solowey, et al.[20] report the isolation of *Salmonella* from 35 per cent of 5,198 samples of dried whole egg examined, and 52 *Salmonella* types were serologically identified from the isolations. Other workers, Gibbons, et al.[21, 22] and Schneider,[23] report isolations in varying amounts.

Although the types reported as occurring in egg powder with the greatest frequency are among those found in human and animal infections, outbreaks of *Salmonella* from eating dried egg products have not been reported. It is the opinion of the author that while the *Salmonella* types isolated are serologically identical with those found in food poisoning outbreaks, their pathogenicity may have been lost by some mechanism of passage through the hen as a host or through the selective action of the lysozyme, the natural germicide in the egg. The fact that outbreaks have not occurred should not preclude the presence of such bacteria. The contamination of egg powder with *Salmonella* from a human or rodent source might prove as infectious as it would in other foods.

It is evident that bacterial standards for dried egg products would serve to assure sanitary plant operations since poor operations would be reflected in high bacterial counts, and would serve to bring about constant checks for types of bacteria known to have public health significance.

DRIED MEAT

Dehydrated meat is one of the recent developments in the dried food field. As Ritchell, et al.[24] pointed out, comparatively little work has been done on the microbiology of this product as compared with that done on the bacteriology of uncooked or cured meats. They demonstrated that dried meats of high viable bacterial count showed a rapid decrease in storage. With initial bacterial counts of approximately 21,000,000 per gm. only 510,000 remained alive at the end of 3 weeks, 3,000 at the end of 18 weeks, and 180 after 49 weeks. Experimental work carried out by Haines and Elliot[12] demonstrated that in order to prevent bacterial growth the meat should reach 52° C. (125° F.) within the first hour of dehydration and remain above that temperature until a fairly low moisture content is reached.

In the report of the work done in the U. S. Department of Agriculture on Meat Dehydration[25] a resumè of the "Control of Bacteria and Molds" in dried meat manufacture may be found. As stated in this report a large number of organisms were killed in precooking of the raw material at 165° F. for 30 minutes. Bacterial spores were the predominating forms found in the dehydrated product. "On the basis of the experimental work, dehydrated meat was safe, from a bacteriological point of view, when produced in accordance with federal specifications for the products . . . dehydrated meats stored under conditions unfavorable for mold growth, as previously indicated, should offer no opportunity for contamination or growth of food poisoning bacteria. Reconstituted meat should be consumed promptly, since tests showed it is to be an excellent bacterial medium."

Dried meat with high bacterial counts would not only indicate poor sanitary conditions of manufacture, but also that the product would spoil quickly upon reconstitution. For purposes of plant control, indication of sanitary quality, and as a guide in use, the establishment of bacterial standards would be indicated. Here again it would be necessary to resort to direct microscopic methods

to develop the true picture of the conditions of manufacture.

The Committee on Foods (except milk) of the American Public Health Association [26] opened the question of establishing bacterial standards for dehydrated foods and pointed out that it would be necessary to determine what methods and standards could be applied to all classes of dehydrated foods. Jones [9] discussed, at some length the establishment of bacterial standards for dehydrated vegetables. He states, "The setting up of standards based upon the microbial content of dehydrated products presents considerable difficulty. It has previously been pointed out that a low bacteria count may be the result of storage at relatively high temperatures, e.g., room temperature . . . From the results presented in this paper it is apparent that a total count of not more than 100,000 bacteria per gram of blanched product may be readily achieved. Coliform bacteria should be absent in 1/200 gram product." He goes on to say that if coliforms are found in 1/20 gm., steps should be taken to check the processing. Haines and Elliot [11] suggested that a bacterial "production standard" might be set up for use in manufacture, and a "consumption standard" be used for utilization purposes. This would prove of value from a manufacturing standpoint but would not be practicable for checking samples of material offered for sale unless a complete history were at hand.

There is not enough information available upon which to base the limits of bacterial standards for all products. Additional research is needed and it should be directed toward determining the basis for reasonable standards. Since such standards would be used largely to determine the sanitary conditions of manufacture they should be determined by surveys of actual operation. It would seem that they should be a part of the standards of quality. No product should be manufactured under conditions that would be revolting or detrimental to the consumer, and consumers of dehydrated foods are entitled to an assurance of the proper method of preparing the products. Jones [9] makes an excellent point that, "Plant sanitation deserves greater emphasis. Workers should have impressed upon them the fact that they are handling a food product and that personal hygiene and cleanliness are essential."

Although there is very little to indicate the presence of pathogenic microorganisms, which have retained their pathogenicity, in dehydrated foods, any bacterial standards should provide that the food is free of those organisms known to be pathogenic to man. This should also take into consideration those bacterial types generally used as indices of contamination, such as *E. coli*.

Reports in the literature and experience of actual operations indicate the need for bacterial standards for dried and dehydrated foods. Such standards should be on a reasonable basis and should take into consideration any variations which might be found to exist in normal operations with a good product. All such standards should be for voluntary application or for adoption as a code by the industry.

Perhaps the most useful standard would be that for bacterial count by the direct microscopic method. Certain modifications would be necessary before the method could be used for all products. Reasonable limits could be set, based upon conditions of reasonable plant operation, and these would reflect the sanitary quality of the dehydrated product just as other tests reflect the edible quality. It would then be necessary to establish standard methods of operation under which the bacterial standards could be met; otherwise, no uniformity of results could be expected. The lead in establishing and coördinating such standards should be taken by

such an organization as the Food and Nutrition Section of the American Public Health Association.

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The Problem of Reconstituted Milk*

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RECONSTITUTED milk, the production and use of which have greatly increased in many parts of the world in recent years, is not of recent origin. Over seven centuries ago[1] the world's most famous traveler Marco Polo while visiting the Mongol Emperor Kublai Khan, realized the value of dried and reconstituted milk. These Mongols were nomads who required convenient food for their many expeditions. Quoting Polo, "they have milk dried into a kind of paste to carry with them. When they go on a journey, every man takes some 10 lbs. of this dried milk with him, and of a morning he will take half a pound of it and put it into his leather bottle, with as much water as he pleases, so as he rides along, the milk paste and the water get well churned together into a kind of pap, and that makes his dinner." There is some evidence that the ancient Egyptians may have used dried milk, but the interesting report made by Marco Polo is the first account of such a product.

Condensed milk has been manufactured for nearly 100 years and evaporated milk for more than 60 years; however, satisfactory processes for drying milk have been developed only within the present century. Today powdered milk is used throughout the world, but this valuable commodity is of comparatively recent commercial origin.

Due to the shortage of fresh fluid milk in certain areas of this country, particularly in the South, there has been a trend toward extending local supplies of fluid milk by reconstituting milk products back to the approximate chemical composition of fluid milk with water. This was particularly true in those areas where the population was abnormally increased due to the influx of military and defense plant personnel. All indications are that the use of reconstituted milk and cream will continue.

A number of ingredients may be used for reconstituting milk; these are listed herewith: (1) skim milk powder with fresh cream, (2) skim milk powder with butter, (3) plain condensed skim milk and natural cream, (4) plain condensed milk with unsalted butter, (5) whole evaporated milk, (6) combinations of any of the above, either with water or with natural fluid milk. By far, the most common materials used for reconstituting milk in the State of Louisiana are concentrated skim milk with natural cream, with or without natural fluid milk. The State Health Department has information, however, that in some instances powdered milk may be used. Some of the milk is sold in bottles bearing caps labeled "reconstituted milk," while other reconstituted milk has been mixed with fresh fluid milk and sold in bottles labeled simply as "milk."

The Public Health "Milk Ordinance and Code,"[2] recommended by the

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 14, 1946.

U. S. Public Health Service, defines reconstituted or recombined milk or cream as follows:

> Reconstituted or recombined milk is a product resulting from the recombining of milk constituents with water, and which complies with the standards for milk fat and solids not fat of milk as defined herein. Reconstituted cream or recombined cream is a product resulting from the combination of dried cream, butter, or butter fat with cream, milk, skim milk, or water.

The Louisiana State Sanitary Code[3] defines reconstituted or recombined milk or cream as follows:

> Reconstituted or recombined milk is a product resulting from the recombining of milk constituents with fluid milk or water and which complies with the standards for milk, milk fat and solids not fat of milk as defined herein. Reconstituted or recombined cream is a product resulting from the combination of dried cream, butter, or butter fat, with cream, milk, skim milk, or water and which complies with the standards for cream as defined herein.

Both of these codes further require that all bottles, cans, packages, and other containers enclosing milk or any milk product defined in the code shall be plainly labeled with the name of the contents as given in the definition of the code. In other words, these codes recognize reconstituted milk and cream as food products which may be sold if properly labeled, and of course if they are not otherwise adulterated or misbranded.

On July 15, 1946, Act 159, enacted by the Legislature of the State of Louisiana, was signed by the Governor. This is an Act designed to protect the public health and safety, and requires all fluid cream and milk or other milk products which may be converted into fluid milk or fluid cream, shipped or transported into Louisiana, to be of the standard required by Standard Ordinance and Code of the U. S. Public Health Service and by the Sanitary Code of the Louisiana State Board of Health. This act also provides for inspection of milk produced for shipment or transportation into this state and the conditions under which it is produced, and provides for the issuance of permits to shippers or transporters by the Louisiana State Board of Health. The Louisiana State Sanitary Code outlines the sanitary conditions under which such fluid milk must be produced. At present, regulations are being prepared governing the sanitary conditions under which milk must be produced to be used in manufacturing milk products, including the various concentrated and dried milk products.

During World War II the armed forces purchased, for use by military personnel, large quantities of concentrated milk products for shipment to areas in this country and abroad where there was a shortage of safe fluid milk. Accordingly, the Quartermaster Corps of the U. S. Army[4] issued tentative specifications for non-fat and whole dried milk solids as well as concentrated whole and skim milk to be used in making reconstituted milk. Specifications were also issued by the Quartermaster Corps for pasteurized milk blended with reconstituted dried whole milk. The specifications included bacterial, chemical, sediment tests, and sanitary standards, not only for the products referred to above, but also for the raw milk used in their manufacture.

The American Dry Milk Institute, Inc. *Bulletin No. 906*[5] has set up sanitary and quality standards for the dried milk industry, which involve farm sanitation and quality of milk supply, equipment and plant sanitation, handling and drying methods, analysis and grading of the finished products, and packaging requirements. In addition, the Institute published *Bulletin No. 911*,[6] setting forth the standards for various grades of dried milk products including chemical and physical properties, bacterial count, and sediment. It

states that it is generally agreed that the bacterial count of non-fat dry milk solids is not necessarily an indication of the quality of the raw milk from which the dry product is made. The process of manufacture has a direct bearing upon the extent to which bacteria are destroyed.

In July, 1946, a letter was written to the health officer of each state requesting information regarding regulations and standards, including bacteriological and chemical tests for reconstituted milk. Forty-two replies were received and classified as shown in Table 1.

As noted in Table 1, in eight states the sale of reconstituted milk is prohibited by law, but one of these allowed it to be sold only during the war emergency.

Seven states permit sale under the Standard Milk Ordinance and Code recommended by the U. S. Public Health Service. One of these states accepts it only on the basis of the quality of the raw milk, and two require that reconstituted milk meet bacteriological standards, but these standards were not defined.

In five states it is permitted in those communities which have adopted the Standard Milk Ordinance and Code.

Thirteen states have special laws or regulations pertaining to its sale and distribution. Most of these require that it meet the minimum chemical composition of fluid milk with respect to butter fat and non-fat-solids content, and must be properly labeled. One state controls it indirectly in that all fluid milk must be produced on dairy farms within the natural milk shed which has been inspected and approved by the Dairy and Food Commission. One southern state allows its sale on an emergency permit basis. This permit is issued by the state board of health on recommendation of the county health officer if the local fluid milk supply is short. It requires pasteurization before concentrating and during recombination, and sets a maximum standard plate count of 30,000 per ml. after pasteurization. It provides sanitary, bacteriological, and chemical standards for ingredients used in the reconstitution, including the concentrated milk ingredient, fresh whole milk, water, and plants set up for the purposes of both dehydration and rehydration.

The director of the dairy and food division of the department of agriculture of one of our northern dairy states asserted that because of the high temperature dried products are subjected to, it does not seem that these products would involve a major problem with respect to health hazards. The process or act of reconstituting milk would be the main problem, including among other things, the sanitary quality of the water used. In addition to the chemical standards for dried milk products, that state requires a standard plate count not greater than 50,000 per ml. on a reconstituted basis when the milk is reconstituted with sterile water.

Seven states have no laws or regulations governing its sale and distribution, and two of these stated that none is sold within the state.

Information received from two states was unsatisfactory for classification purposes.

The increased use of reconstituted milk by military personnel prompted Randall[7] to investigate it from bacteriological, chemical, and biological standpoints. At the time, these studies were carried on, Randall was a Major, Veterinary Corps, United States Army, stationed in Manila, Philippine Islands.

The product used was a reconstituted milk prepared from skim milk powder shipped from California and butter from Australia to which was added water obtained from an artesian well. It was pasteurized during the reconstituting process and bottled in the usual manner for pasteurized whole milk.

Randall made bacterial and Breed counts of the skim milk powder, butter, water, and the finished product at monthly intervals. He found the bacterial plate colony count of the butter and water consistently low, while that of the skim milk powder was high. The Breed count of the skim milk powder was excessively high, indicating a probable high bacterial content of the fluid skim milk used for drying. Both the bacterial plate colony and Breed counts in the finished product were well within the prescribed limitations for Grade A pasteurized milk.

Chemical examinations of two samples of milk powder which had been stored for 5 months showed a moderate darkening of color, a decreased solubility, and a faint musty odor, but no suggestion of tallowy odor. The Kreiss test for oxidation of fat was negative, and the total solid content, including fat, of the reconstituted milk met standard requirements.

In the biological experiments conducted on rats, the vitamin content of the reconstituted milk was not appreciably changed by the reconstituting process.

Randall concluded from this experimental work, that a fluid milk can be prepared from skim milk powder, sweet (unsalted) butter, and water, that will closely approximate pasteurized cow's milk.

Tice, Tisdall, and McCreary[8] devised a method of supplying reconstituted milk for drinking purposes to the Royal Canadian Air Forces personnel in isolated stations. This consisted in the use of gas-packed whole drug milk which was thoroughly reconstituted by means of an electric mixer, strained, and aged in a refrigerator for 24 hours before serving ice cold. They reported the aging process greatly improved the taste of the milk.

Curtis and Hileman[9] in a study of the comparison of media and incubation temperatures for making bacterial counts of spray process dry skim milk have shown that the use of tryptone agar with incubation at 32° C. (89.6° F.) for 48 hrs. as compared with the standard method using standard agar and incubated at 37° C. (98.6° F.) resulted in a 94 per cent increased plate count. The tryptone agar showed a marked increase over that obtained by the use of standard agar 51.9 per cent at 37° C. and 87.4 per cent at 32° C. while the reduction in the incubation temperature resulted in a similar but somewhat lesser effect—standard agar 3.5 per cent —tryptone agar 27.7 per cent.

Crossley and Johnson[10] reported the bacteriological aspects of the manufacture of spray dried milk and whey powders. The bacteriological count of the final powder showed great variations and was affected by many factors, such as, the initial bacterial content of the milk, types of organisms initially in the milk, pasteurization variations, and plant cleanliness. Various types of bacteria were found. Coliform organisms were usually present but almost always in small numbers, mainly of the aerogenes type. It was also found that 48.5 per cent of the coliform strains were heat resistant as compared with 2.2 per cent of the raw milk strains. Plant contamination by heat resistant strain was an important factor. While the actual spray-drying destroyed many bacteria, some non-thermoduric species survived, and it could not be relied upon to kill pathogenic bacteria; hence the need of reliable pasteurization. During storage of the dried milk there was a considerable but variable decline in the number of bacteria, with rapid disappearance of the coliform type.

Dr. Robert S. Breed,[11] Chairman of the Committee on Standard Methods for the Examination of Dairy Products, of the American Public Health Association, recently made the following pertinent statement:

Fresh milk properly pasteurized is naturally to be preferred to any reconstituted milk; but the use of milk is so important from the standpoint of nutrition that there is, in my judgment, every reason to extend the use of reconstituted milk, evaporated or other type of dehydrated milks in areas where milk supplies are not sufficiently abundant to be used generally. The development of the dehydrated, evaporated, and condensed milk industry in the United States has resulted in a much larger per capita use of dairy products than would otherwise have taken place, and the nutrition of our children has been greatly benefited. Such products can normally be put on the market at prices that make them available to the general mass of the people. Experience has shown that the danger of the spread of infectious disease by the use of dehydrated or canned milk products is practically nonexistent.

Recently, however, Allen and Baer [12] have reported an outbreak of septic sore throat due to reconstituted milk. The outbreak was caused by milk from a "mechanical cow." The reconstituted milk was prepared from powdered dry milk, sweet cream, unsalted butter, and water. Beta hemolytic streptococcus was the causative organism.

When both fresh whole and dry whole milk are figured to the dry basis for comparison, using data prepared in *Tables of Food Composition in Terms of Eleven Nutrients*,[13] there is noted little chemical difference in the two products.

Nevens and Shaw [14] studied, in feeding tests with albino rats, the apparent digestibilities of the total protein, fat, sugar, and total solids of fresh whole milk, spray process powdered whole milk, and roller process powdered whole milk. No significant differences in the apparent digestibility of the two kinds of powdered milk were found.

The apparent digestibility of the protein of fresh whole milk was significantly higher than that of powdered whole milk. The fat of both fresh whole milk and powdered whole milk was found to be about 99 per cent digestible, while the sugar of both kinds of milk was completely digestible.

The detection of reconstituted milk and cream is difficult, as the tests presently used have not proved conclusive. The possible destruction of part of the vitamin content, the extent of which depends upon methods used for concentrating the raw milk product, and reconstituting, is not sufficient to serve as a basis for characterizing milk as having been reconstituted. Perhaps most significant are the properties of the precipitated curd with adherence of part of the natural lactose to the curd in such a way that it cannot be readily washed out. The latter is stated to be the basis for the Evenson test.[15] Some slight differences have been reported in the protein constituents of milk caused by concentration, but these are not considered sufficient for detecting the presence of reconstituted milk in fluid milk.

Although milk can be reconstituted in such a way as to comply with the usual chemical and physical tests for added water in fluid whole milk, it may show the presence of added water when analyzed by the usual methods for determining added water in fluid milk, if it is not properly reconstituted.

W. H. King has been appointed associate referee in the Association of Official Agricultural Chemists, to study the chemistry of reconstituted milk, particularly with reference to chemical tests. In his first report, at the October, 1946, meeting of the Association at Washington, D. C., he stated that there is need for improvement in methods which have been used to detect the presence of reconstituted milk by objective chemical tests. Further investigation is planned of present tests and other chemical approaches to the problem.

It appears that the use of reconstituted milk will be largely confined to those tropical or sub-tropical areas where the local supply of fluid milk does not meet the demand. This is not only

TABLE 1

State Regulations Governing Sale of Reconstituted Milk

Illegal	*U.S.P.H.S. Milk Ordinance and Code*	*State Enforcement through Local Ordinances*	*State Milk Ordinance*	*No State Regulations*	*Unclassified*
California	Colorado	N. Dakota	Alabama	Delaware	Missouri
Florida	Georgia	S. Dakota	Connecticut	Indiana	Oregon
Massachusetts	Kentucky	Texas	Idaho	Iowa	
Michigan	Nevada	Virginia	Illinois	New Jersey	
New York	S. Carolina	Washington	Louisiana	New Hampshire	
Ohio	Tennessee		Maine	Pennsylvania	
Rhode Island	W. Virginia		Maryland	Utah	
Wisconsin			Minnesota		
			Mississippi		
			Nebraska		
			New Mexico		
			Vermont		
			Wyoming		

true of some of the southern states of the United States but applies also to certain foreign countries.

At the present time, several southern cities are using reconstituted milk as an adjunct to their fluid milk supply. Plans are being formulated by the Department of Agriculture to try out reconstituted milk prepared from powdered milk in 16 schools—4 each in Louisiana, Mississippi, Georgia, and South Carolina. The reconstituted milk will be used not only in the preparation of cooked dishes, but converted into a beverage that looks exactly like bottled milk. The experiment will be closely watched and records kept of which dishes the children liked best, and how well they drink the dry-milk-and water beverage.

Mexico City has just started the use of reconstituted milk on a large basis. The dry milk is obtained from manufacturers in the United States, reconstituted and pasteurized in Mexico City and distributed in wax paper containers.

SUMMARY

The legal, bacteriological, sanitary, chemical, nutritional, and analytical aspects of reconstituted milk are presented.

Information received from 42 states covering regulations governing the sale of reconstituted milk show great variation, as given in Table 1.

It seems apparent that the use of reconstituted milk, to supplement natural fluid milk, is increasing in various parts of the world.

The study of reconstituted milk should be continued, particularly with the view of establishing bacteriological, chemical, biological, and sanitary standards for this product.

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What Is a Public Health Engineer or a Sanitarian?

That question is answered for New York State by a recent addition to Chapter XI, "Qualifications for Public Health Personnel," of the New York State Sanitary Code. The recent addition is known as "Section G" and is entitled, "Public Health Engineers, Sanitarians, Sanitary Inspectors."

The public health engineer is described as that individual with professional training and experience in engineering, plus specialized training in the application of his engineering knowledge and skills to public health.

The sanitarian is listed as the person who, through training and experience, is qualified for membership in a scientific profession and with specialized training in methods and techniques utilized for the protection and promotion of the public health through control of the environment. "Activities related to the control of milk, food, or other phases of environmental sanitation not involving public health engineering" are given as examples of duties.

The sanitary inspector is classified as the subprofessional individual.

The Code Amendment goes on to require all appointing authorities to employ only those public health engineers, sanitarians, or sanitary inspectors who can show satisfactory evidence of possessing the minimum requirements as established by the Amendment. Five grades of engineers are outlined, giving typical duties and required training and experience necessary for each grade. Three grades of sanitarians are described in a similar manner. There is only one grade of sanitary inspector provided for.

The Amendment referred to above appears in a *Health News Supplement* for June 30, 1947 published by the New York State Department of Health, Albany.

Safe and Beneficial Utilization of Nuclear Energy*

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THE last half century has seen more scientific advances than any similar period in the history of civilization. Acceleration of discoveries and inventions, and their application to applied science have been most noticeable in the past fourteen years. There is a variable but unavoidable lag phase between the acquisition of any new scientific fact and its application to a practical use. The shorter this lag phase the more rapidly will civilization progress. Scientists in coöperation with industry have an unprecedented opportunity to develop the safe production and utilization of nuclear energy for peacetime uses. One can scarcely conceive of a basic science which is not essential to the full realization of this objective. The medical profession and the specialty of industrial hygiene are destined to play important roles.

It is human nature to emphasize the dangers of recently developed powerful agents and to lose sight of their probable usefulness. It is not unlikely that prehistoric man was introduced to fire as a naturally occurring result of lightning having ignited some object or objects in his environment. His immediate concept of fire, doubtless, was that of a most dangerous and destructive agent. The first ingenious and courageous man who was able artificially to produce and control fire must indeed have gained both the envy and the distrust of both friend and foe. With the advance of civilization, fire has remained an ever potential hazard. Yet its beneficial uses have been so developed and utilized that at present it is one of the essential agents of modern civilization. The evolution of controlled nuclear energy can and must bring this new source of power to a similar esteem in the eyes of the civilized world.

With the discovery of nuclear fission and the production of nuclear energy on a large scale, the old hypothesis that matter is indestructible is no longer tenable. It is possible to convert mass into energy and the latter may be dissipated in the performance of useful work or at a complete loss into the surrounding atmosphere. Einstein's equation $E=mc^2$ where E represents energy in ergs, m denotes mass in grams, and c equals the speed of light in centimeters per second, represents the energy possible were there a complete conversion of mass into energy. One must hasten to emphasize that such a complete conversion of any particular mass is impossible even with uranium 235 or plutonium. It is possible to convert only a very small per cent of the mass of these substances into energy. In the case of uranium 235 the ratio of mass lost by fission to the original mass is approximately one-tenth of one per cent. The best known yield of conversion of mass into energy is in the sun where it is approximately one per cent. This does not mean that there is not an enormous

* Presented before the Industrial Hygiene and Public Health Nursing Sections of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 13, 1946.

amount of power made available by the conversion of mass into energy. One kilogram of uranium 235 in undergoing fission loses one gram of mass and releases 25,000,000 kilowatt hours of energy.

While there is a vast quantity of potential nuclear energy, which may be released from a naturally abundant metal such as uranium, there are certain aspects relative to its production on a commercial basis which at the present prohibits its competition with the energies derived from the combustion of oil, gas, and coal. This does not mean that in the near future the situation may not be reversed. There are many scientific purposes to which the products of controlled nuclear energy are being put at this time. We are concerned with the hazards of production of nuclear energy and the immediate utilization of its products.

RADIATION HAZARDS OF PRODUCTION

Uranium occurs in nature admixed with small amounts of radium. During the separation and purification of the crude uranium ore there is a possible human exposure to external radiation from alpha and beta particles and gamma rays. Radiation may arise from an external or internal source. The latter results from radioactive dusts, gases, or solutions which have gained access to the interior of the body through absorption by the skin, the lungs, or the gastrointestinal tract.

The neutron is a type of radiant energy particulate in character, neutral in charge, and derived from the nucleus of the uranium 235 atom when it undergoes fission. During the process of fission the uranium atom breaks into two fragments known as fission fragments. These vary in size, chemical composition and degree of radioactivity; some are gases, others solids. In general, those in the ascendancy have approximately one-half the atomic weight of the original uranium 235 atom. A neutron from a uranium 235 atom undergoing fission may be captured by an atom of uranium 238 which in turn transmutates into the radioactive element plutonium. Many other elements contained in the pile as impurities may likewise capture a neutron and transmutate into radioactive isotopes. From this it is seen that two different types of radioactive isotopes are formed in the pile, one by fission of uranium 235, and the other by neutron capture. Neutron capture also may give rise to the release of radiant energy in the form of gamma rays. The isotopes, formed as a by-product of the pile, may emit beta particles, gamma rays, or both. The pile thus becomes a radiating source for large amounts of potentially dangerous radiant energy.

Gamma rays and neutrons are important as the primary hazards from external radiation. Both are extremely penetrating and capable of producing profound and harmful biological changes. Injury may result from external beta radiation in which damage is usually confined to the skin. It is doubtful if external radiation from alpha particles presents any hazard because of their poor penetrating ability, most of them being stopped by the clothing or the superficial layers of the skin.

Alpha, beta, and gamma radiations may result in serious damage once their parent source gains access to the interior of the body (internal radiation), through skin absorption, inhalation, or ingestion. The resultant injury is largely independent of the route of entry but directly dependent upon the type or character of the radioactive material, its distribution within the body, its storage, its rate of excretion, its half-life, and the amount of material involved. The toxicity of uranium *per se*, because of its low radioactivity, is chemical in nature and will be discussed later. The reverse is true of radium and the many radioactive fission products and isotopes.

Radium stored in the body can be detected by the presence of its gaseous decay product, radon. The presence of radium within the body in no way alters or changes its rate of decay. The gaseous radon establishes an equilibrium with the amount of radium contained within the body and is partially absorbed by the circulating blood and carried to the lungs where it is liberated with the expired air. A measurement of the amount of radon in the expired air of an individual is an index of the amount of radium contained in the body of that individual. The amount of radium which can be tolerated in the body because of its low rate of excretion, its high degree of radioactivity, and its long half-life (1590 years), is extremely small and has been considered to be not more than one-tenth (0.1) of a microgram.

All living cells whether of man, animal, or plant, are capable of injury from these various types of radiant energy. The extent, location, and type of injury which may be sustained, are dependent upon the kind of radiation under consideration, its physical properties, mode of application (whether external or internal), intensity, duration of exposure, and the character and function of the cells of the species of animal or plant being subjected to irradiation. In other words, the degree and character of the biological changes resulting from irradiation are dependent upon many complicating factors and often subject to difficulties of interpretation.

Many important contributions to radiation biology have been made by the various laboratory groups working on the health protection aspects of the atomic bomb. These findings are now being evaluated and written for publication in the not too distant future. The *modus operandi* of irradiation upon biological tissue and body systems is not thoroughly understood and requires much additional study. When this mechanism is known, we will probably have a much better understanding of the mysteries of life.

In man the most sensitive tissues are the reproductive cells of the generative and hematopoietic systems. These are the systems which will be first noticeably effected by chronic exposure to suitable types of radiation. In certain types of laboratory animals, namely, mice and fruit flies, the genetic mechanism is known to be susceptible to damage at relatively low dosages. In each instance the probability of an injury, and its degree, is dependent upon the character of the radiant energy, its intensity and duration, and the frequency of exposure. The reproductive function may be temporarily decreased, interrupted, or permanent sterility may ensue. The circulating leucocytes and erythrocytes may be unaffected, slightly decreased, or depleted. As the degree of injury on the hematopoietic system increases, a profound leucopenia may result followed by a reduction in the number of platelets and red blood cells with a concommitant fall in the hemoglobin. Should the amount of the irradiation be sufficient, the animal or individual may manifest cutaneous, subcutaneous and internal hemorrhages with bleeding from the body orifices. These latter indicate extensive injury and the individual may succumb from secondary infection. The bone marrow and lymph nodes in such instances may reveal almost complete destruction. Such a disastrous result may eventuate from repeated chronic irradiation or from a single exposure as experienced by the people of Hiroshima and Nagasaki and the test animals at Bikini. It is not improbable that animals and humans thus exposed but not succumbing may at a future date show an increased incidence of leukemia as compared with an unirradiated but otherwise comparable group.

CHEMICAL HAZARDS OF PRODUCTION

Chemical hazards are present during

certain phases of the production of nuclear energy. Here we are principally concerned with the toxicity of uranium and its multiplicity of compounds including the fluorides. Although uranium is a weakly radioactive substance (alpha emitter), this particular property as such is of no practical importance as a radiation hazard in comparison with its chemical toxicity. Its detection in body excreta, therefore, generally depends upon its chemical rather than upon its radioactive properties. One of the first problems of the health groups was to develop a reliable quantitative method for its detection in very small amounts. A method was developed which enables one to measure accurately one part in 10,000,000 in animal tissue, blood, or urine. Its presence can be detected in much smaller amounts, 1/2,000,000,000 of a gram.

To a limited degree, the toxicity of uranium varies with the solubility of the compounds. The various compounds may be encountered in the form of particulate dusts or gases. Protection against chemically toxic dusts and gases is an old problem to industrial engineers, toxicologists, and industrial hygienists. Protection consists in completely closed systems where possible, adequate circulation systems to evacuate the deleterious agents from the atmosphere, gas masks, and special procedures for laundering the work clothing of plant workers. Personnel hygiene and rigid medical supervision to detect small amounts of noxious substances in excreta are important features of adequate health protection. Such a program requires that industrial physicians be conversant with the clinical abnormalities likely to result from undue exposure to the chemical involved. The production of the atomic bomb and the peacetime utilization of nuclear energy and its products have and will require the utmost in coöperation between industry, industrial hygienists, radiobiologists, toxicologists, and scientists in general.

The toxicology of uranium and its various compounds has been the subject of a very thorough and careful investigation. It is doubtful that any other industrially hazardous chemical has had a comparable investigation in such a brief time. The results of these studies carried on by the several medical groups are being assembled for publication. It is sufficient to state at this time that many of the uranium compounds may be obsorbed into the body through the skin, by way of the lungs, or from the gastrointestinal tract by ingestion. Uranium *per se* is primarily a nephrotoxic substance and is principally excreted through the kidneys.

Despite the urgencies of war, the operation of the Manhattan Project resulted in an enviable safety record for the undertaking as a whole. The hazards which have been enumerated can be circumvented. In the conversion of this new industry to peacetime pursuits, there must be no relaxation of protective measures.

THE BENEFITS OF NUCLEAR ENERGY AND ITS PRODUCTS

The possible benefits to be derived from the peacetime utilization of nuclear energy and its products present to the scientists a situation almost comparable to a Utopia. Certainly 20 years ago, today's scientific and pseudo-scientific thoughts would have been classed as the dreams of a madman, to wit, stratosphere rockets, man-made meteorites, or possibly a celestial body, radio-controlled, nucleo-powered cargo planes, uranium powered ocean going ships capable of crossing and recrossing the ocean on the energy derived from the conversion of one gram of mass to energy.

Various multi-million dollar regional experimental laboratories are being established for further research on development and utilization of nuclear energy.

Large-scale projects range from stationary power plants to mobile plants for the propulsion of battleships and submarines. The not too distant future of these projects would seem to be hopeful.

The products of nuclear energy for peacetime purposes have been available since late summer of 1946. To stimulate and encourage fundamental research in medicine, biology, chemistry, physics, and other sciences, the Manhattan District at Oak Ridge, Tenn., developed a program for the production and distribution of radioactive isotopes on a national scale. The first eleven months following V-J Day were spent in the conversion of the pile to isotope production, procuring of personnel, and the setting up of an organization for the equitable distribution of the isotopes. Major General Groves appointed an Interim Advisory Committee on Isotope Distribution Policy and two advisory subcommittees, one on Allocation and Distribution, and one on Human Applications. The advisory committees were to operate in conjunction with Dr. Paul Aebersold, Chief, Isotopes Branch, Research Division, U. S. Engineer Office, Manhattan District, Oak Ridge, Tenn.

The success of this program may be measured by the following acomplishments. More than 50 radioactive isotopes are being produced by the uranium pile through neutron irradiation and fission processes for national distribution. Between July 1 and September 30 of this year more than 150 applications for isotopes have been received and processed. The vast majority of these applications have been approved. Thirty-eight or more of the requests have been for C 14. Within the coming year it is anticipated that the production of C 14 will be sufficient to supply the needs of most research workers presenting worth while problems. It seems likely that the limiting factor in distribution in the near future may well be the lack of instruments and well trained personnel for the utilization of the available isotopes.

Prior to the war many of these isotopes were known and made in small quantities by cyclotrons. While the quantities available by cyclotron production were relatively small and limited in experimental utilization to a few centers, sufficient information has been obtained to establish their importance as an investigative tool and possible therapeutic agent.

A note of warning should be sounded in reference to the value of these radioactive isotopes as therapeutic agents. The *most important* and *immediate* value will be as an investigative tool. This does not mean that important therapeutic uses will not and are not being made of certain radioactive isotopes at the present, but the public must not expect them to furnish an *immediate* cure for cancer. Many secrets remain to be pried from the isolated cell and the organism as a whole relative to their metabolism and physiology under normal and pathological states. The attack on cancer, therefore, must be both a direct and indirect one.

The radioactive isotope C 14 seems likely to become one of the most important that will be utilized as a tool. Carbon is the one element which is common to all organic compounds. Carbon, hydrogen, and oxygen, plus chlorophyll and the sun's rays are responsible for a vast source of energy in the form of carbohydrates. Under the conditions of extreme heat and pressure that exist in the sun, hydrogen is converted into helium with the liberation of tremendous amounts of energy. It seems likely that C 14 and H 3 have an obvious destiny in the hands of well trained scientists in helping to reveal many of nature's secrets. There are many other radioactive isotopes which are or will prove important but time and space permit the mentioning of only a very few, such

as, sulfur, iodine, potassium, hydrogen, iron, arsenic, sodium, and phosphorus.

Should no advantage other than the quantity production of a large number of isotopes accrue from the Manhattan Project, the expenditure of $2,000,000,000 will eventually be repaid many times over in the years to come from increased commercial production and better health to the nation.

A great deal of fundamental investigation by various groups in the country has been done with radioactive iron to study anemic states and the formation of hemoglobin, and the body's reserve of iron. The body needs for potassium and sodium have been studied by the use of radioactive isotopes of these elements. Radioactive phosphorus is potentially a useful agent for the treatment of polycythemia and the leukemias. Radioactive iodine seems promising in the treatment of selected cases of hyperthyroidism and a certain small percentage of cancers of the thyroid. The general public must be neither overoptimistic nor pessimistic but should be hopeful. It will require some time before the efficacy of radioactive iodine for the treatment of hyperthyroidism can be evaluated in comparison with the surgical care of such cases. Its use in certain types of cancer of the thyroid would seem to be more rational for the treatment of malignancy than is the use of phosphorus in leukemias. But again, it must be emphasized that cancer of the thyroid is infrequent in comparison with cancer in general, and of the total thyroid cancers only a very small per cent retain the ability to absorb and retain sufficient amounts of radioactive iodine to be of therapeutic value.

Without a doubt many scientists in the next few years will strive to find or synthesize chemicals having a toxicity for certain cancer cells and a high predilection of absorption by these same cells in contrast to the cells of the normal body tissues. Should such a compound be discovered the next logical step would be to select a radioactive isotope having the proper half-life and energy values and synthesize it into the compound. By so doing the cancer could be attacked both by a chemical toxin and an internal radiation limited primarily to the site or sites involved by the cancer tissue. Such a possibility is not an idle dream but its realization may be delayed.

The real solution for the cancer problem does not lie in its surgical and radiation treatment. It lies rather in discovering the fundamental principle or principles wherein a healthy cell escapes its normal growth restraints and disregards its function as a serviceable unit of an organized whole.

SUMMARY

We have briefly reviewed the possible dangers in what is potentially the most hazardous industrial process known to man. It has been pointed out that the hazards were circumvented during the wartime. There can and must be a safe peacetime production and utilization. The commercial and scientific benefits are multitudinous. The program for the national distribution of radioactive isotopes is well under way and from this single feature alone will come many new scientific facts which will be of inestimable benefit to us all.

The American Academy of Pediatrics Study of Child Health Services: Results to Date*

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IN November, 1944, when the American Academy of Pediatrics committed itself to undertake a nation-wide study of child health services, it is doubtful whether anyone realized the true significance or the magnitude of the step which had been taken. The recognition by an organized group of medical practitioners of their responsibility for informing themselves, through their own labors, about medical care matters, as well as their realization of the need for assistance from public agencies experienced in such undertakings, has produced a coöperative enterprise which is unique in many respects.

Simply stated, the objective of the study is to gather information on the present status of child health services in this country to be used as a basis for future planning. In accordance with this stated objective, the Academy, with the assistance of the U. S. Public Health Service, and the U. S. Children's Bureau, has developed a program through which the facts concerning existing facilities and services for child health may be made available to all groups, public and private, national and local, for use in furthering programs for child health.

The most immediate as well as the most rewarding results of the study to date have been the development of a spirit of coöperative enterprise and the evident stimulation of interest among members of the medical profession. The almost universal demand on the part of the various states that the statistical material be returned to them as quickly as possible indicates both the great interest which the study has aroused and the apparent need for such a project at the present time. This increasing state and local interest has emphasized the importance of returning quickly to the states, information basic to local planning.

The difficulties anticipated in trying to secure adequate finances and personnel for the study have not proved as great as was feared. All but two states are conducting study programs, and these two are expected to get under way shortly. State programs have been financed from a variety of sources,

* Condensed from a paper read by Katherine Bain, M.D., at Joint Session of the Maternal and Child Health Section and the School Health Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 13, 1946.

such as local chapters of the National Foundation for Infantile Paralysis, state departments of health, medical societies, tuberculosis organizations, local foundations, and other sources. Space, equipment, and clerical assistance, as well as funds, have been provided by many agencies, notably health departments.

Qualified personnel for the conduct of the study have not been as difficult to find as was anticipated. Of the 57 executive secretaries employed by all states, 33 are physicians of whom 29 are pediatricians. As of November 1, 1946, 5 states had completed their studies and had delivered their schedules to the central office for tabulation of the data; 11 states had completed the collection of the data, and 14 others were nearing completion. Surprisingly good returns on the schedules have been secured, with some states obtaining 100 per cent returns from pediatricians, and as high as 75 per cent returns for all physicians in private practice.

As the collection of the data nears completion, the question arises—What sort of information will be forthcoming from this study? Although a study of this type cannot answer the specific question—"How many children did not receive adequate medical care in a given year?" it can and will provide much valuable information concerning such items as the proportion of care rendered children by general practitioners as compared to the proportion given by specialists; the amount and type of pediatric training received by physicians who are caring for children; the proportion of visits to children for purposes of health supervision; the number of children admitted to hospitals annually; and the number of children who attend schools which have some sort of school health program.

Data on these and other items will be forthcoming shortly from the North Carolina study which has served as the pilot study for the entire program. The North Carolina study, begun about a year ago, has been the pilot not only for methods of organization and the content and wording of the schedules but for the methods of analysis as well. Revisions of the original schedules have necessitated many revisits in North Carolina, but the data for that state are now coded, the cards punched, and the tables are being prepared. Soon after January 1, 1947, a complete report will be available from North Carolina which can serve as a guide for other state reports.

The following brief discussion of some of the material obtained in North Carolina will serve to indicate the type of information which will be available from this and other states in much more detail. The original list of physicians compiled for North Carolina contained 2,079 names. To each of these was sent a letter with the appropriate schedule (III-A) attached. Subsequent information concerning physicians who had died, moved, or were not in active practice, reduced this list to 1,571 physicians in active private practice. Of this number, 1,105 filled out a schedule completely or in part, a rate of coöperation of 70 per cent. In order to determine the difference in coöperation among the various age groups of physicians, a single item on the schedule, the completion of a one day record of child visits, was selected as the index of coöperation. A total of 966 physicians completed this part of the schedule (see Table 1). Cooperation was best in the younger groups, a little less than 75 per cent response having been received from the age groups under 45. For physicians over 65, the response was only 50 per cent. Perhaps younger physicians are more interested in problems of medical care, or perhaps the older physicians have become resistant, through long exposure, to the questionnaire method.

One question which the study pro-

TABLE 1

Physicians in Private Practice Who Reported Number of Child Visits during One Day, by Age of Physicians. North Carolina, Spring, 1946

	Total	Under 45	45–64	65 or Over
1. Total in North Carolina in private practice	1,571	536	817	218
2. Number who reported child visits	966	395	463	108
3. Per cent who reported child visits	61	74	57	50

poses to answer is, "Who takes care of the children?" Admittedly pediatricians are so few in number that if children are receiving care they must be getting it from general practitioners. What proportion then of visits made by general practitioners is for children? The average number of visits per day per general practitioner in North Carolina was 25. This figure includes patients seen in office, hospital, or patient's home. Of these 25 visits, one-third were for persons under 15 years of age (see Table 2). The pediatricians' figure for total visits per day was 26, very close to that of the general practitioner. Ninety-nine per cent of the pediatricians' visits were to children.

The figure of 25 visits per day per general practitioner was of considerable interest. The study was made in May and June in North Carolina when low illness rates might be expected. Sundays, holidays, and days off were all included. The range of total visits for all physicians was quite wide. Eight per cent of the general practitioners made no visits on the report day, while 9 per cent made more than 50 visits. This sample of 558 general practitioners in North Carolina may be too small for reliable conclusions. The returns on this item from other states are awaited with interest.

If the general practitioner is giving so much of his time to child patients, is he seeing sick children or is he devoting a share of his time to health supervision of well infants and children comparable to the time given to this activity by the pediatricians (see Table 3)? Of home, hospital, and office visits to children made by pediatricians, 35 per cent, or

TABLE 2

Number of Total Visits and Child Visits per Day per Physician: General Practitioners, Pediatricians, and Other Specialists. North Carolina, Spring, 1946

	General Practitioners	Pediatricians	Other Specialists
1. Number of total visits per day per physician	24.7	25.5	20.1
2. Number of child visits per day per physician *	8.5	25.2	3.2
3. Per cent of total visits which were for children	34%	99%	16%
4. Number of physicians reporting	558	39	236

* Children under 15 years of age

TABLE 3

Number and Per cent of Child Visits in One Day Which Are for Health Supervision: General Practitioners and Pediatricians. North Carolina, Spring, 1946

	General Practitioners	Pediatricians
1. Number of child visits per day per physician *	8.1	25.2
2. Number of child visits for health supervision per day per physician	1.6	8.7
3. Per cent of child visits which are for health supervision †	20%	35%
4. Number of physicians reporting	624	39

* Children under 15 years of age

† Well children seen for health examinations, immunization, advice on feeding, and so forth

1 in 3 visits, were for well children. The comparable figure for the general practitioner was 20 per cent, or 1 visit in 5. The exact nature of this health supervision is not known. Many of the visits may have been for immunization alone. Further analysis may show that the general practitioner's practice is heavily weighted by visits to infants under 1 month, since obstetrics is largely in the hands of the general practitioner. Nevertheless, these preliminary figures indicate that the general practitioner plays a large role in health supervision.

What about the relative amount of child health supervision given by private practitioners and by medical well child conferences? To make such a comparison, certain adjustments in the figures must be made. Since the age groups served should be comparable, only child health supervision visits to children 1 month through 5 years by private practitioners have been included. Because the returns from well child conferences represent all the service in the state, the physicians' returns have been adjusted to 100 per cent (see Table 4). In North Carolina about 7 times as many visits for health supervision of infants and preschool children take place in the physicians' offices as occur in well child conferences. The general practitioner is doing about 4 times as much of this work as the pediatrician. Stated in another way: Of the visits for health supervision for the age group 1 month to 6 years, 71 per cent are made to general practitioners, 16 per cent to pediatricians, and 13 per cent to child health conferences. The actual load of the general practitioner is heavier still, for from a preliminary review of the Series II schedules, it is apparent that in North Carolina the general practitioner is an active participant in child health conferences.

One might go on from here to ask a number of other questions. How are the general practitioners trained in pediatrics? Within the last few years there has been great emphasis on growth and development and on behavior problems in the training of pediatricians. To what extent have these fields become a part of the training of the general practitioner? One section of the study is directed toward answering these and other questions on medical education. The study of pediatric education is just starting, a pilot study having been undertaken at the University of Michigan Medical School in October, 1946. During the current academic year all medical schools and teaching hospitals in the United States will be studied intensively regarding undergraduate training and specialty training in pediatrics.

Though results of the Academy study in the form of statistical tables are meager at present, other less specific results point to a substantially significant trend. Coöperation in a common

TABLE 4

Total Volume of Health Supervision for Children Aged 1 Month to 6 Years, in One Day: Private Practitioners and Well Child Conferences. North Carolina, Spring, 1946

		Number	*Per cent*
Child visits for health supervision	Total	1,330	100
By physicians		1,158	87
General practitioners		948	71
Pediatricians		210	16
To well child conferences (one day) *		172	13

* Total visits 62,859 divided by 365

venture has been undertaken and has been successfully carried out between a private organization of physicians and two federal agencies. Interest of the physicians themselves has been captured. Many pediatricians who coöperated at first from a sense of duty, are now vitally interested and are making extensive plans for use of the material in their own states.

Although the immediate task has been limited to the collection and analysis of the facts concerning current child health services, it is apparent to all that this task constitutes only the first step toward the achievement of the ultimate goal—the development of an adequate program of health and medical care for all children. To the members of the study staff who have been closely involved in the conduct of the study, the successful development of this spirit of coöperative enterprise and the evident stimulation of interest among members of our own profession have been the most significant and the most encouraging results of the study to date. All indications now point to a growing realization of the next step as a logical outcome of the present activities: the development of an action program to improve health services for children.

National Hearing Week

The American Hearing Society announces National Hearing Week, November 9–15. In this campaign to focus public attention on the hearing, it is joined by its 120 local chapters throughout the states. Nearly 3,000,000 children and nearly one out of every ten persons in America have a hearing loss.

For details of the National Hearing Week, write the American Hearing Society, 1537–35th Street, N.W., Washington 7, D. C.

The Value of Industrial Hygiene*

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HYGIENE is a branch of medical science that relates to the preservation of health. This definition outlines the scope to which our thinking should be carried when we evaluate the effects that may result from the coördination of the many sciences that are contributing to the well-being of our industrial population.

Since the main objective is prevention of illness from the occupational environment, the medical profession must accept the responsibility and be the guiding spirit in realizing this objective.

The effects of any agent on the human body must of necessity be studied with regard to the normal physiological actions as well as the abnormal. This dual concept is fundamental in medical science. While the medical phase may play a dominant part in our evaluation of the worth of industrial hygiene there are three other distinct elements: engineering, chemistry, and physics, all of which must be closely correlated if we are to attain our objective.

Industrial management has at times overlooked the value of controlling industrial environment, not only from a purely economic basis but also from the point of view of the psychological reactions of the individual worker. This fact has been emphasized more recently by the increased interest shown in the matter by our organized labor groups which were keenly aware of the psychological factor in spurring the production reached during the period of World War II.

Perhaps the greatest advance made during the recent war years has been the attempt to analyze individual jobs in respect to the physical and mental requirements. This job analysis made it necessary not only to study the physical effort necessary for the job but also the chemistry of the materials involved in the job. Furthermore, the engineering aspects of the machine and its functional operation in its relation to the individual who has the responsibility of operation has elicited extensive study.

Much still remains to be done in this matter of relation of the worker to the job. It definitely is a phase of industrial hygiene in its broadest conception.

Since 1915 much has been accomplished by our efforts in accident prevention in our industrial plants. These efforts were based on the theory that all accidents can be attributed to mechanical failure. The human element, which perhaps is a factor of failure in 80 per cent of our industrial accidents, has been entirely neglected. In view of the broadening vision that industrial well-being is an asset in any accident prevention program to render it of real value, there must of necessity be an equal interest in and a study of the human element in its relation to the mechanical causes of all industrial injuries. This requires the close coördination of industrial hygiene personnel and those responsible for safe mechanical working conditions. With such an organization we will enter a new era in our efforts to reduce the enormous toll of accidents in industry. According to

* Address of the Chairman, presented before the Industrial Hygiene Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 12, 1946.

statistics of the National Safety Council for the year 1945 there were 16,000 fatalities, 80,000 permanent disabilities, and 104,000 temporary disabilities charged to industry. This constituted a man-day loss to industrial production of 46,000,000 days—a loss which cannot be estimated in monetary value.

The working population in the United States now numbers approximately 60,000,000 persons, and out of this group there are probably 15,000,000 persons working in those industries which use potentially hazardous materials or processes. In these selected industries, perhaps about one-third of the total persons employed are exposed to some type of material or process which may involve a potential health hazard. These 5,000,000 exposed persons present a very real problem to industry throughout the nation, and the value of industrial hygiene is being demonstrated by the preservation of the health of these people.

During the war years a new viewpoint was developed toward industrial hygiene activities. Many industries suddenly were faced with the problem of protecting the health of thousands of men working with hazardous materials or processes. There was an instantaneous demand for trained personnel, and this demand was filled by drawing persons from related fields of activity in medicine, engineering, chemistry and physics.

One of the outstanding accomplishments in the field of control of occupational diseases during the war period was the work of McConnell, Flinn, and Brandt in government owned ordnance explosive plants. In the 968,000 man-years of operations (among 309,000 operating employees in 101 plants) there were only 28 fatalities because of occupational disease—22 from trinitrotoluene, 3 from nitrous oxide, 2 from carbon tetrachloride, and 1 from ethyl ether—a rate of less than 3 fatalities per 100,000 workers per year. Despite the magnitude of explosives production, the total of 22 fatalities due to TNT reported here is but a small fraction of the 475 fatalities reported from TNT and related compounds during relatively limited production in World War I. The Army has a commendable record. It established this record even though there was no industrial medical program in the Army in 1941, by using civilian physicians already trained in this field. I am glad to see such results published.

Many industrial organizations have equally commendable records and they too should be published. In fact, I have been amazed at the dearth of such material in our journals. We can be proud of our records, so why not set them down for all to see? Our story in this regard which we all hope to see published soon and which again will show the need for and the value of industrial hygiene is that of the production of the atomic bomb. I am sure all of us, now that part of the story is known, can imagine the magnitude of the task which confronted the physicians, engineers, and physicists at plants engaged in this work. We do not know the whole story as yet, but at least we know industrial hygiene stood the test and was a great factor in the success of this project.

The atomic bomb was a dramatic unveiling of the tremendous power and energy which now can be made available for the benefit of man. It has opened new fields, not only for the possibilities in the generation of power, but it will make available many of the ninety-six known elements in radioactive form. The availability of these radioactive elements will result in many important applications. Perhaps one of the most important applications is their use as tracer elements. Another definite possibility is in their therapeutic application.

The smashing of atoms produces, among other things, tremendous radia-

tion; and the usefulness of the various radioactive elements will be determined to a considerable extent by the emanations which they give off. A challenge is presented to us in this preventive field, and the successful utilization of atomic energy will depend upon the elimination of health hazards associated with the variety of radiations which occur in their use. Electrons, neutrons, alpha particles, gamma rays and other radiations will be included in the field of industrial hygiene as lead and benzol have in the past.

Among examinations of noteworthy effort were those made on workers engaged in the manufacture of insecticide bombs for the armed services. Over half of the bombs produced used a formula containing pyrethrum, sesame oil and freon. Since none of these materials is very toxic to human beings, there was no particular problem of health protection involved. After DDT had been developed and sufficient information was available to indicate that it could be used with safety by personnel of the armed services, a potential hazard was created by continuous eight-hour-per-day exposure among persons performing the various manufacturing operations, and this had to be given serious consideration.

The problem involved not only the possibility of breathing the fine mist produced by the aerosol from the Bug Bombs, but also the possible significance of absorbing DDT through the skin. This hazard was recognized prior to the actual use of this material and, by close coöperation between our industrial hygiene engineers, manufacturing personnel, process and layout engineers, a complete new installation was made with protective measures built in as a part of the original layout of the equipment. Where it was not practical to eliminate the hazard by suitable design and layout of equipment, the hazard was controlled by use of personal protective equipment and sanitary measures. Adequate pre-placement and periodic physical examinations were made on all employees involved in this operation. Several months after production was started, certain laboratory findings indicated a need for slightly better control, and such control was established. The production of Bug Bombs has continued into the post-war period, and there have been no cases of illness of occupational disease as a result of these operations.

Another of the high production war items was radar equipment. The manufacture, testing, and operation of the various types of radar equipment involved numerous exposures to high frequency radiation. This type of radiation had been relatively unknown except in the laboratory, and of course there were many suppositions that this radiation might be harmful to human bodies. Some of the common illnesses to which average persons are subject were quickly associated in the workers' minds with this new radiation. Extensive tests and examinations have indicated, however, that these radiations have no harmful effect on persons other than the slight amount of heating which may occur. Usually this heating is negligible and no particular hazard has been demonstrated.

Recently a completely new concept has been established which unites the growing of food, its processing, packaging, and distribution. This close coordination of all these activities at one location has been referred to as "agro-industry." Agriculture and industry have been transmuted into a single integrative activity. This concept of agro-industry is extremely large. It is in fact one of those grand ideas that stagger the imagination with their scope, complexity, and implication. Agro-industry has been applied to the cultivation of cane and root crops, and the manufacture of starch and sugar in

the Everglades of Florida. This concept of agro-industry opens another new field in industrial hygiene.

The impetus given to the study and control of industrial health hazards during the past few years has resulted in a fuller appreciation of the value of industrial hygiene. It is a broadening field and it is now utilizing the services of hundreds of specially trained personnel. The field of industrial hygiene is continuing to draw talent from related professions and it is uniting physicians, chemists, engineers, and physicists in this broad endeavor of safeguarding the health of our industrial workers.

Those of us who are devoting full time to industry and attending the managers' meetings to insure an adequate budget for the current and following years have had it only too thoroughly impressed upon us that the era of "cost plus" is over; things are now different; competition in the price of production is again becoming the paramount issue, and curtailment of expense will be the keynote in every possible phase. This is quite a different story from the one we heard during the war period.

This brings us then to what I feel is an important phase of this discussion concerning the value of industrial hygiene. What are we as physicians doing to preserve the gains made during the war? What have we learned that is going to help us to continue to achieve greater stature among industrialists, the employees, and, last but not least, our own medical profession? It may be presumptuous to suggest the means by which an employer can evaluate his preventive hygiene service. Our experience in large and small plants, however, indicates that management is anxious to have a yardstick by which it can measure the effectiveness of all services. This applies in particular to those who are genuinely interested in the welfare of their workers.

There are tangible profits which may be shown, such as a reduction in absenteeism, a diminution in the number of grievances presented by individual employees relative to working conditions, the reduction of occupational disease claims, the reduction of actual compensation costs through a reduction in accident frequency, and a reduction in labor turnover. The intangible benefits such as the improvement in general health as the result of periodic physical examinations, and an intensive program of health education can well be included in the estimate of the value of an industrial hygiene program in industry. All of this brings to our attention the necessity of an annual inventory of our work which can be presented to management only if adequate records are kept, and this factor too is of the utmost importance for future programs in the field of industrial health.

In considering the future value of industrial hygiene, one cannot neglect the problems of education. Although limited training now is available in various universities to those who wish to enter the field, there still is need for the establishment of complete courses which will develop workers for the field of industrial hygiene.

We all are familiar with the studies made a number of years ago which indicated that the mortality and morbidity rates among the industrial population were greater than those of the general population. The value of industrial hygiene will be measured in the future by a reduction of the mortality and morbidity rates of industrial workers to the point where they may even be lower than those of the general population.

It is not possible to treat this subject wholly in the time allotted or by a single presentation, but even a brief consideration of our topic suggests the existing challenge to us physicians, engineers, chemists, and physicists upon whom falls the responsibility of safe-

guarding the health of our industrial workers. And, further, it suggests a challenge which presents a new horizon and new frontiers in the field of preventive medicine in its broad aspects. If we meet this challenge we shall contribute greatly to the continuance of our American Way of Life.

International Tropical Medicine Congress to Meet in Washington, May, 1948

Wilbur A. Sawyer, M.D., Executive Secretary of the State Department's Division of International Congresses, announces the first American meeting of the International Congress of Tropical Medicine and the International Congress on Malaria in Washington next May. The Department of State will sponsor the meeting with the coöperation of five governmental agencies and fifteen scientific societies including the American Public Health Association.

These organizations all have representatives on an Organizing Committee appointed by the Secretary of State with Thomas Parran, M.D., as Chairman, George K. Strode, M.D., and Clarke L. Willard as Vice Chairmen, Rolla E. Dyer, M.D., as Program Director, Wilbur A. Sawyer, M.D., as Executive Secretary, and William L. Breese as Secretary. The representative of the A.P.H.A. on the Organizing Committee is Henry E. Meleney, M.D., who is also Convener of Section XI, Public Health. The scientific meetings will be held in twelve sections: I, Research and Teaching Institutes; II, Tropical Climatology and Physiology; III, Bacterial and Spirochetal Diseases; IV, Virus and Rickettsial Diseases; V, Malaria; VI, Helminthic Diseases; VII, Protozoan Diseases; VIII, Nutritional Diseases in the Tropics; IX, Tropical Dermatology and Mycology; X, Tropical Veterinary Medicine; XI, Public Health; XII, Medical and Veterinary Entomology. There will also be scientific and commercial exhibits and a program of motion pictures on subjects related to tropical medicine. In addition, there will be visits to the laboratories of the Department of Agriculture in Beltsville, to the National Institute of Health in Bethesda, and to other scientific institutions in and around Washington.

Physicians, scientists, and other professional persons qualified in tropical medicine will be enrolled as Members of the Congresses. Those interested are advised to write to the Executive Secretary, Fourth International Congresses on Tropical Medicine and Malaria, Department of State, Washington 25, D. C., for a copy of the Preliminary Announcement with the Advance Registration and Hotel Reservation Form.

Age and Sex Variations in Hospital Utilization*

(An Example of Morbidity Data Available from Blue Cross Records)

J. D. COLMAN, M.E.

Executive Director, Maryland Hospital Service, Inc., Baltimore, Md.

WHETHER a patient did or did not receive hospital care is likely to be governed by his geographic location rather than by the type of condition needing care. However, the practical fact that much data describing serious illness are available from hospital records forces us, at the outset, to accept a compromise with our instincts of precision. Hence we find much morbidity data based on the frequently unbiologic and unpathologic distinction between illness cared for in or out of hospitals. Even in view of the wealth of material available concerning the utilization of hospital care, its usefulness has been materially limited by the difficulty in arriving at any satisfactory description of the population from which these hospital patients came. Thus significant incidence rates expressed in terms of hospital patients per unit of population per year were available only in their crudest form.

The growth of Blue Cross Plans is of interest in this connection because they have the unique advantage of having a known population base. It is possible to, and they do count carefully, the people who comprise their population because it is necessary to collect subscription charges from them. Consequently, we have, for the first time, a large portion of the population whose use of hospital care is known and whose characteristics as to age, sex, marital status, residence, etc., is known for both that portion of the population that was hospitalized and that portion that was not.

As the proportion of the population enrolled in Blue Cross Plans grows, the likelihood of their enrolled population being materially different from the total population diminishes. The most challenging of the opportunities for study of hospital morbidity offered by Blue Cross data is that which recognizes that, for at least some of our subscribers, the hospital history is continuous over a long period of time. Fifty-six per cent of the participants enrolled in the Baltimore Blue Cross Plan in 1937 are still active subscribers. Very little data of this sort have been developed and it would appear that some important facts would be disclosed from their study. The considerations introduced by the diminishing population base are serious, but do not nullify the value of the study.

As an example of the kind of information which is available from even a simple analysis of Blue Cross records, I present a study of the experience sustained by the Maryland Hospital Service in which its utilization data are classified by the age and sex of the subscribing population. In considering these data, I should remind you that for the most part the experience described was sustained during the war

* Presented before the Vital Statistics Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 13, 1946.

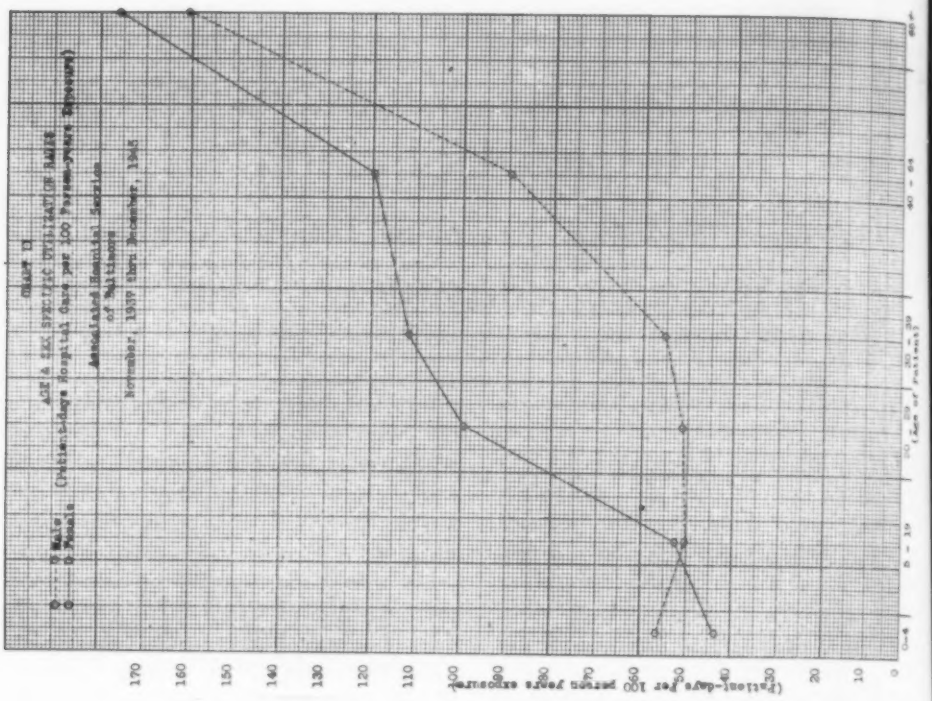
Chart II
AGE & SEX SPECIFIC HOSPITALIZATION RATES
(Patient-Days Hospital Care per 100 Person-Years Exposed)
Associated Hospital Service
of Baltimore
November, 1939 thru December, 1945
Male
Female
(Patient-days per 100 person years exposure)
(Age of Patient)

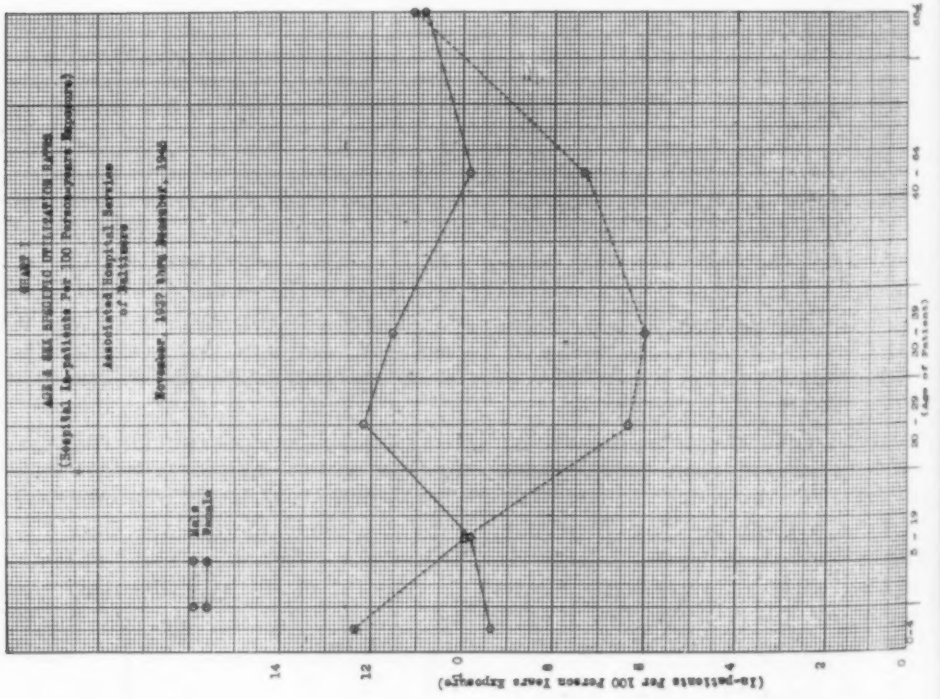
Chart I
AGE & SEX SPECIFIC HOSPITALIZATION RATES
(Hospital Admissions Per 100 Person-Years Exposed)
Associated Hospital Service
of Baltimore
November, 1937 thru December, 1945
Male
Female
(In-patients Per 100 Person Years Exposed)
(Age of Patient)

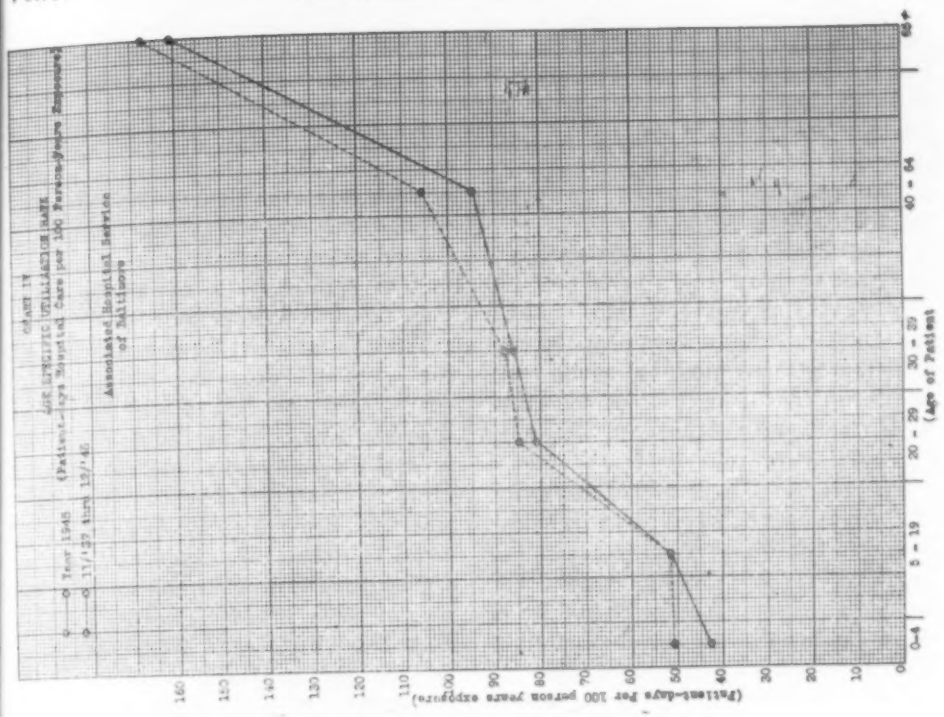
Chart 11X
AGE SPECIFIC UTILIZATION RATE
(Patients-days Hospital Care per 100 Persons-Years Exposure)
Year 1945
11/13/39 thru 12/45
Associated Hospital Service
of Baltimore
(Patient-days Per 100 person years exposure)
0-4
5 - 19
20 - 29
30 - 39
40 - 64
65+
(Age of Patient)

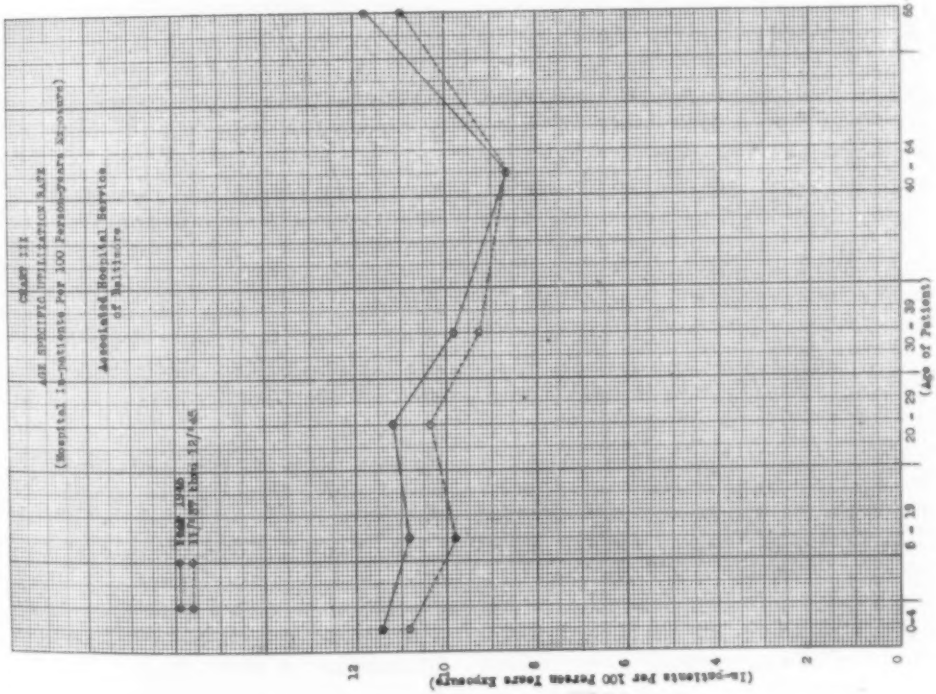
Chart 11X
AGE SPECIFIC UTILIZATION RATE
(Hospital In-Patients Per 100 Persons-Years Exposure)
Associated Hospital Service
of Baltimore
Year 1945
11/13/39 thru 12/45
(In-patients Per 100 Person Years Exposure)
0-4
5 - 19
20 - 29
30 - 39
40 - 64
65+
(Age of Patient)

years and that only a portion of the obstetrical care used by the population is included herein. Otherwise, however, these data represent a reasonably complete description of the hospital care received by this population in acute general hospitals.

Chart I describes the incidence rate in terms of hospital patients per 100 person-years of exposure—classified by age and sex. From several points of view this is interesting, but much more significant, particularly from the economic standpoint is the data shown in Chart II.

This chart describes the utilization of hospital care in terms of patient days of hospital stay per 100 person-years of exposure—classified by age and sex. The intense variation with age should be of great significance to hospital administrators in planning for the amount of hospital facilities needed in the future in view of the changing age distribution of our population.

It will be noted from the headings on the two previous charts that these described the experience during the entire life of Maryland Hospital Service from November, 1937, to December, 1945. Because of the rapid growth of the subscribing population, most of the exposure supporting these data was sustained during the last three years of this time interval. As one might expect, there have been slight changes during the period which might well be the subject of more exhaustive study.

An indication of these changes is given on Chart III in which age—specific utilization rates, expressed in terms of hospital patients per 100 person-years exposure are shown for the calendar year, 1945, as well as for the entire period, November, 1937, through December, 1945. It is obvious that the frequency of admission has tended to increase at all ages except the 40 through 64 group.

By reference to Chart IV, however, the effect of crowded hospital facilities is seen. Chart IV presents hospital utilization in terms of patient days per 100 person-years exposure, classified similarly as in Chart III. From this it will be seen that even though the frequency of hospital admissions had increased, the volume of hospital care rendered per unit of population is less during 1945 than for the entire period.

While I have not burdened you with the detailed data supporting these charts, I may say that sufficient exposure supports each point on Charts I and III so that they may be considered statistically significant. I have not yet been able to find my way through the mathematical maze of significance as it applies to a rate expressed in terms of patient days per 100 person-years of exposure. Therefore, I express no opinion on the statistical significance of Charts II and IV, except the "horseback" one that if the rate for patients is significant, the rate based on the days stayed by the same patients from the same population is likely to be.

While some interesting trends are revealed in these data, my purpose in presenting them here is not so much for their intrinsic value but rather to stimulate any of you who have access to Blue Cross records to explore their potentialities more fully as a source of significant morbidity data. The obvious objections of possible selection can, in many cases, be overcome if careful extraction of specific rates is made from which useful adjusted rates can be computed.

Many plans are now using the diagnostic code developed by the U. S. Public Health Service and the Bureau of the Census. The happy fact that a practical Diagnostic Code and a known population came into being at the same time should materially extend our understanding of acute illness. The epidemiology of the acute appendix and the hypertrophied tonsil, if you will'

The People Win for Public Health in Colorado*

FLORENCE R. SABIN, M.D.

Chairman, Subcommittee on Health, Colorado Post-War Planning Committee, Denver, Colo.

TWO years ago the State Government in Colorado had only one interest in its Division of Public Health; namely, that it was one more place in which to try to force political appointments. Moreover, the Denver city machine had had a remarkably successful record in defeating health bills in the legislature. The machine had only to pass the word down the line to kill health bills, and they were killed.

Now, what a change! There is a new Governor, Lee Knous, who campaigned for good government and specifically for a health program, and is enthusiastically carrying out his pledges. On May 20, 1947, an election in Denver brought into office a new Mayor-elect, Quigg Newton, a young man who ran, without benefit of party, against government by political machines. He won more votes than all four other candidates together. He understands the fundamental principles of the movement; he wants, just as eagerly as informed citizens, a modern, professionally staffed health department, and a strengthened medical school for training physicians for both curative and preventive medicine—indeed a true medical center for the Rocky Mountain region. No wonder Coloradoans walk on air and talk of health to match their mountains! They have won the decisive battles of their campaign and now have only to get on with the business of public health in Colorado. As a matter of fact, recent history has even more significance than any one cause, however vital, for it has shown that under our American form of government whenever our people really want good government they can have it.

The story of the health program is as follows: In 1945 the Governor of Colorado appointed a Health Committee as part of a post-war planning program and was then persuaded by this committee, by the State Division of Public Health, and the Colorado Public Health Association, to ask for a health survey of the state. By great good fortune, the American Public Health Association was able to undertake a survey through a grant from the Commonwealth Fund, and its Field Director, Dr. Carl E. Buck, came to study conditions.

Dr. Buck made a masterly report. He studied the vital statistics of the State Health Division, analyzed and arranged the data until they told a vivid story of the state's health deficiencies. He found that the State Health Division was badly placed in the government, being a division under the Governor instead of a department, and that it had been subject to repeated attempts at political control. He found that the division had an able director and a small but well chosen professional staff; however, state appropriations were pitifully small—less than 10 cents per person per year—so that the division would have had almost nothing had it not been

* Presented at the Fourteenth Annual Meeting of the Western Branch, American Public Health Association, San Francisco, May 28, 1947.

for generous federal grants; that the City of Denver, by a curious archaic charter, was a so-called "Home Rule City" beyond the reach of modernizing influences from the state; and that of the 63 counties only 4 had full-time health services. Dr. Buck's report revealed the short-comings, pointed out the reasons for them, and made what proved to be expert recommendations for their correction.

Two different types of work were then started, both closely correlated with each other; first, the organization of an executive committee for intensive study of the report and for drawing up the bills to be presented to the legislature; and second, the carrying of Dr. Buck's report and of all the Health Committee's plans as they developed directly to the people of the state.

An executive committee, authorized by the large general committee, had many long conferences. Most of them were at dinner meetings. At each meeting were invited guests who were either representatives of groups that would be affected by the proposed development of health services, or experts who could help with special knowledge and advice. Thus opposition was forestalled in advance. Civil Service Commissioners were also invited to discuss common interests.

One of the outstanding achievements of the program was the full coöperation between the State Medical Society, reaching all the doctors in the state, and the various public health agencies. Two members of the Public Policy Committee of the State Medical Society became members of the Health Committee and made a liaison between the two groups. Common bills were presented to the legislature, jointly drawn and jointly sponsored. Indeed the Medical Society gave up its tax-exempt status and increased its dues that it might support an active lobby.

Another important success in the health program is that support of the dairy industry was won for health inspection. Like the dairy group in some other states, the group in this state had long feared and fought health inspection of its industry. Many conferences were held with them which were indeed initiated at a luncheon to which they invited the Health Chairman. She was bumptious enough to ask them why they fought the program, and invited them to have a representative on the Health Committee. He gave much help and arranged conferences with members of the Dairy Association, and with all the experts on the subject of milk in Colorado, both from the federal and state groups. Full agreement was reached on the need for higher standards and improved practices for production and for processing of milk and milk products, but the dairy industry wanted to have it designated by law that a dairyman must be on the Board of Health to represent the industry. The Health Committee refused to accept the principle of representation of any group by law. The point was won in the legislature, much to the committee's surprise. The committee was not opposed to the choice of a dairyman for the Board of Health—indeed the Governor appointed both a producer and a processor. Now the State Department of Health and the dairy industry will work together with good will to a common purpose. This is an interesting example of a method of dealing with a controversial issue of long standing; namely, extended discussions to separate the many details on which adjustments can be made from the very few principles, or perhaps only one, too critical for compromise.

When the committee had completed the study of the report and its recommendations, it started to formulate the proposed bills. Fortunately able and experienced legislators and attorneys were members of the committee. It also had the invaluable aid of an attorney,

Hubert Henry, Chairman on Health of the Interim Committee of the Legislature, together with the help of the able secretary of the Legislative Reference Bureau, Clair Sippel. The bills were drawn in advance so that preliminary copies could be sent to the county chairmen and so that they could be introduced early in the session.

The winning of popular support for the program was crucial to its success. Since this was a state program, popular education was started in the counties. Dr. Buck helped to organize the first inter-county meeting. Indeed, every county meeting drew its audience from at least two or more counties. This was always highlighted by definite identification of each county group. It will be remembered that distances are great in Colorado; people drove 75 to 100 miles to meetings. They had been shocked by the complete defeat of the health bills in the last session of the legislature and so were ready to listen. At the early meetings, Dr. Buck with the help of a blackboard, let the facts about the appalling death rates from preventable and controllable disease sink in as the audience listened to the speakers. He showed how essential participation by the audience was to a program.

The committee had no state appropriation for its work but the Division of Health received the approval of Dr. Fred T. Foard, Regional Director of the U. S. Public Health Service, to use federal funds. This, together with a grant from the Colorado State Tuberculosis Association, enabled the committee to have an executive secretary. Herbert Moe organized the meetings and was always able to attract an audience eager to hear the story of Colorado's public health. One member of the committee had wide acquaintance all over the state and was able to find local citizens who could lead their communities. Persons were chosen as individuals rather than as representatives of organizations. At first each name had to be submitted to the Governor, but he was finally persuaded to give the committee a free hand. Teams recruited from the State Division of Public Health, the medical school, the public health physicians of the public schools, and other groups were provided for each meeting. Dr. Roy L. Cleere, Director of the State Division, took to each county data concerning the local problems, and showed how close should be the coöperation between state and county health services. There were no prepared speeches but new data as developed in the executive committee, were taken to each meeting. A second meeting in a given place always brought the comment, "How your program is growing."

The committee did not itself organize action in any group but merely presented data on conditions, local and state, and showed what public health services could accomplish. Initiation for action was left to the people themselves. As a method, it is the exact opposite to the building of a political machine; it leaves one less sure of results, but with a more lasting foundation. Each local group took up some problem of its own. The first response was in a town where the raw sewage was going into the river and the Mayor soon started a fund for a disposal plant.

In one town the women said that they could see so much dirt in the milk that they did not use it at all. Within a few days the very efficient Supervisor of Nurses and the City Manager of the town with ten women met with the committee in Colorado Springs. El Paso County has an exceptionally efficient milk inspector, really a public health educator—and had developed there a milk supply that is both clean and safe. The group saw a perfectly run dairy—run by a woman, I am pleased to say—and a pasteurizing plant that is the last word in excellence. As a result, the town in question now has good pasteurized

milk shipped in by two companies and a local dairy is putting in a pasteurizing plant. The dairy industry might take notice that public health services are good unpaid advertising agencies, when milk is made both clean and safe. None of the groups did just the same type of work, but all supported the state program and all enjoyed the prestige of working as a Governor's Committee. One group worked politically and reported that all candidates who were against the health movement were defeated and all who were for it elected.

Another phase of the work that has aroused great enthusiasm and rivalry in the state is the federal hospital program. Dr. Foard assigned two members of his staff, Dr. Le Grand Byington and Dr. H. T. Wagner, to make a survey of the hospitals; a medical social worker from the State Division of Public Health, Helen Cannon, visited every hospital to aid in making out the schedules for the Commission on Hospital Care.

As evidence of the interest of the people of Colorado in the health movement, it is now many months since the committee has itself organized a meeting. Rather, every meeting has been on invitation, and speakers have gone to clubs and other groups all over the state. Committee members have spoken, it would seem, to almost every club in the state, both men's clubs and women's clubs. Many of the women's clubs have made the health program their special work for the year; for example, the American Association of University Women and the Parent-Teachers Association in every town where they are organized. In addition, the Women's City Clubs, political clubs, the League of Women Voters, and the Federation of Women's Clubs have all given skilled help. The Chambers of Commerce of the cities have heard about the health program, as well as many Kiwanis and Rotary groups. The Junior Chamber of Commerce and the Isaac Walton League have actively worked for the program. Groups of lawyers, ministers, college, university, and church groups have been addressed. During the weeks before election the author spoke about twice a day, occasionally three times.

Nor has Denver been neglected, nor have the people of Denver failed to hear of the deficiencies of their so-called Health Department. Both newspapers in Denver, as well as the county papers, and the radio gave unstinted support to the new era in health. After election it was planned to let every legislator hear of the health bills in his home town. The result was summed up in one sentence by one of the prominent legislators who said, "We all knew in advance that this time we had to pass the health bills." The people of Colorado had willed it so.

What bills were introduced? Eight bills in all were presented, each one introduced to the legislature under sponsorship of the committee. There were two groups of bills, five bills setting up services for health and appropriations for them, and three bills for controlling special diseases. The first two bills concerned public health services.

The State Reorganization Bill created a new Department of Public Health, with a Board of Health and an Executive Division. The Board of Health was to be of nine members appointed by the Governor in such manner that no business or professional group would constitute a majority. This concession was made by the doctors. The bill gave to the new department powers adequate to meet its responsibilities in improving the health of the state. Some opposition to this bill developed in the Senate, but only from a certain group of the healing arts, who did not so much oppose the bill, but sought to place riders on it to gain advantages or escape restrictions for their cult. Hard work defeated these proposed amendments. The second

health bill was permissive legislation for facilitating setting up county, city-county and multiple-county health units. Both of these bills passed early in the session. They were well drawn and are worthy of study.

The third bill for appropriations and, as is customary, was presented late in the session with appropriations for all divisions of government. The requests were in two parts—one for the State Department and the other for aiding county units. These bills were given intensive study by the appropriations committee and, though no group obtained all it asked for, the Health Department received funds adequate for great improvement of its services. The grant for state aid to the counties was raised from nothing to $150,000 for the biennium.

The fourth bill was an enabling act to meet the federal requirements for participating in the new hospital construction program. The fifth bill was an appropriation bill for the medical school. Under the new Dean, Dr. Ward Darley, plans have been developed to stress public health and the training of more general practitioners, rather than specialists. Dr. Darley also plans to have a two or three year residency with the last six months to be taken in the new county hospitals. These plans are an important advance in medical education and the committee was glad to endorse this program.

The three special bills were as follows: two were to lessen incidence of tuberculosis, the third was to decrease Bang's disease in dairy cattle. The bills in regard to tuberculosis were drawn by the State and Denver Tuberculosis Associations and endorsed by the Health Committee. An increase in the per diem allotment to hospitals of from $4 to $6 for the care of indigent cases was obtained. It was hoped to obtain money for the construction of a new wing of 100 beds at the Colorado General Hospital under the direction of the Medical School, but support was won for a 30 bed ward only. This will, however, aid in the development of chest surgery in the state, place a number of tuberculosis patients in a general hospital, and help with the training of medical students in this disease. It is a minor gain, to be sure, and indicates hard work ahead during the next session of the legislature.

The so-called Cow Health Bill was the only complete defeat of the committee. It was drawn by a veterinarian on the committee to check the sale of dairy cows that are reactors to Bang's disease. It did not include compulsory testing nor require slaughter, but simply the quarantining and reporting of infected cows. The bill was killed by the livestock interests by having it referred to the Livestock Committee where it was permanently buried. Colorado's important beef and dairy cattle industries make the eradication of Bang's disease unusually difficult. The inter- as well as intra-state shipment and sale of infected animals complicates control measures. This disease is a national problem. Obviously much study must be given to the type of legislation needed, and much research is necessary. How do you account for the fact that a cow may react negatively to the agglutination test and at the same time show a positive blood culture? How effective is calf vaccination? These are some of the questions needing investigation.

The legislature adjourned in April. Already the new State Department of Public Health has been reorganized and strengthened in accordance with modern practices. The department has been asked to help four groups of counties to plan new district health units. This is entirely on the initiative of the counties themselves. These are the first fruits of the program giving the people themselves scope for exercising their own initiative.

One of the meetings was especially interesting. The new law provides that the units are to be set up by vote of the county commissioners. The commissioners of five counties were present. All of those who came from counties where there had been any public health nursing were enthusiastically for the unit. A commissioner from the county that had never had any service said that temperamentally he had to express some opposition against such unanimity of opinion and for his part he was fearfully worried lest swarms of public health workers descend on his county and ask for jobs. He never knew how funny he was, since the real worry was to find even one public health worker for his county. Personnel is now the major problem in this state as it is everywhere.

All during the war years the now Ex-Governor refused to authorize the use of federal grants allotted to the Division of Health to aid in training public health workers. Thus we have no backlog of personnel; we are developing a training program, but the need is to set up new services now. The people of Colorado are enthusiastically for adequate public health services.

Fourth Interim Health Commission Meets in Geneva

Global health conditions were reviewed by approximately 100 international medical and public health leaders at the Fourth Session of the Interim Commission of the World Health Oragnization at Geneva Switzerland, August 30 to September 13. These included delegates of the 18 nations on the Interim Commission.

Among the subjects discussed by this session was the World Health Assembly which must be convened within six months after the 26th United Nations country ratifies the WHO Constitution. To date, 13 UN members have approved the document: China, United Kingdom, Canada, Iran, New Zealand, Syria, Liberia, Ethiopia, Netherlands, Saudi Arabia, Turkey, Union of South Africa, and Norway. In addition, 6 non-members have ratified.

The United States delegate at this session was Thomas Parran, M.D., Surgeon General of the U. S. Public Health Service.

Standards of Dental Care in Public Heath Programs for Children*

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At the present time, the majority of state health programs provide for some type of public health dental activity.[1] Study of these dental programs reveals considerable variation in type and in the features which receive greatest emphasis. The program content has developed as the result of local conditions, expediency, tradition, available funds, and decision by influential persons or groups as to the most effective way of spending funds. Consequently, all states do not conform rigidly to a single type of program. Although it is generally agreed by dental administrators that the objectives of the public health dental program may be accomplished by education, prevention, and treatment, there has been much discussion relative to the potential scope or definition of each of these three basic features of the dental program. Until recently, there was no means whereby prevention of dental disease might be exercised; it is found, therefore, that dental health education and dental treatment service, either alone or together, tend regularly to comprise the principal activities currently conducted as legitimate activities of the dental programs in many states.[1]

Dental health education is a prominent feature of dental programs. In some cases it is the exclusive feature. In practice, dental health education of the public by state agencies may extend from the presentation of simple facts on dental health for the guidance of the individual to an attempt at exposition of the whole field of dentistry as it is known and understood by the dentist.

The term "prevention" has been interpreted frequently as treatment for prevention, particularly in the control of dental caries. Based on this interpretation, provision of treatment was justified as a preventive measure on the grounds that filling of carious teeth would control caries to the extent of preventing undesirable sequelae which would culminate in loss of teeth. Recent developments in the use of fluorine as a true preventive of caries promise methods which will reduce considerably the prevalence of this disease.[2, 3] Many state dental administrators have indicated a desire to incorporate in their activities, technics for using fluorine as soon as the efficacy of these methods has been conclusively demonstrated.

Although no longer considered a true preventive measure, in the sense that its use will prevent a disease from occurring, at the present time treatment is considered to be an essential part of the dental program. The use of fluorine as a preventive agent is expected to reduce the prevalence of caries by perhaps 40 to 50 per cent. However, there is still a large amount of caries which will occur, necessitating dental treatment by operative procedures for its control. In addition, there are other dental disorders which create a substantial need for dental treatment of various kinds.

* Presented before the Dental Health Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 13, 1946.

The wide variation in thought and practice relative to the scope of treatment services in public health dental programs makes it desirable to offer in this presentation an interpretation of the potential range of treatment which might be provided. It is likely that one or more, or perhaps all, of the items to be suggested have been provided at one time or another in various public dental treatment programs. Certainly, in the field of private dental practice they are all considered essential to the health of the individual. The decision that a given item of service is necessary, advisable, or desirable if dental health is to be secured for the individual is directly related to the acceptance of a definition of dental health. The means employed to secure the objectives established by this definition are basic dental health requirements, whether treatment is rendered to the patient in the private dental office or in the public dental clinic. Since the items of treatment presented here have been evaluated for inclusion on the basis of a specific definition of dental health, this definition is offered for consideration.

There are many factors which influence the design of such a definition. It is unlikely that any definition would hold for long because of changes in the science of health and changes in the relative importance of its objectives. It is undesirable that any definition should be so inflexible that it cannot be adjusted to such changes. On the basis of these considerations, therefore, dental health may be defined as "the objective which the dental profession has in mind in assisting the individual to achieve a satisfactory state of function, comfort, and appearance, provided that his condition has been completely appraised, that he has been informed of existing defects, and that proper treatment has been suggested and made available to him." *

Based on this definition of dental health, and with due allowance for the practical limitations which would necessarily affect any application of the treatments suggested, the following services might then comprise the dental treatment program. They constitute the means by which the objectives of dental health may be secured. It will be noted that the items presented are given as optimal services and also as minimal services. It is expected that the services provided would range upward from minimal to maximal, in accordance with circumstances which might impose limitations on the individual program. In practice, the scope of the dental treatment program would fall at some point between the extremes suggested.

* A modification of a definition of health by Lawrence J. Henderson, Professor of Biochemistry at Harvard University. Prepared by graduate students in public health dentistry, University of Michigan, April, 1946.

DEFINITION OF DENTAL HEALTH TREATMENT SERVICES FOR CHILDREN *

A Statement of Policy:

Considering the present available information on the scope of services required to assure the health of young patients, an oral health program should provide treatment, preventive measures, and health education.

It appears that limitations of treatment services, due to insufficient funds or personnel, are best applied on the basis of the number of children or age groups to receive care rather than on the number of services or types of treatment to be made available. It seems reasonable, therefore, to provide adequate care for a selected group of children rather than limited services for a large group of children. If dental health programs are developed for the youngest age groups and continuity of care provided thereafter, an accumulation of defects is impossible, and an optimum condition of health, comfort, appearance, and func-

* Based on a statement prepared by graduate students in public health dentistry, University of Michigan, April 1946.

tion would be maintained throughout the period of childhood.

Optimal Dental Services:

1. Period from Birth Through 2 Years *‡

a. Surgical treatment by a competent oral surgeon for the cleft lip or palate.
b. Treatment of mouth infections.
c. Application of preventive measures for securing and maintaining oral health.
d. Recommendation or institution of procedures for breaking harmful habits.

2. Period of the Primary Dentition (3–5 years) ‡

a. Orientation of child to dental environment.
b. Procedures preliminary to diagnosis:
   (1) Examination
   (2) Essential dental records
   (3) Radiograms as required to detect caries and dental anomalies, and to study development, root-end conditions, and progress of treatment.
c. Post-operative observation and supervision of the cleft palate patient.
d. Prophylaxis.
e. Application of preventive measures for securing and maintaining oral health.
f. Restoration of carious teeth:
   (1) Silver amalgam for posterior and anterior teeth.
   (2) Disking of anterior teeth when incisal angle is involved.
   (3) Use of cast restorations for broken down molars on the basis of individual diagnosis.
   (4) Local anesthesia to be used on the basis of individual diagnosis.
   (5) Cement bases to be used on the basis of individual diagnosis.
g. Pulp treatment: The pulpotomy technic will be used to manage vital exposed pulps in this period of dentition.
h. Treatment of mouth infections.
i. Extractions (type of anesthesia to be determined on the basis of individual diagnosis).
j. Orthodontic treatment as required.

3. Period of Mixed Dentition (6–12 Years) ‡

a. Examination, diagnosis, prophylaxis, post-operative supervision of the cleft palate patient, and application of preventive measures to be the same as for the period of the primary dentition.*
b. Restoration of carious, hypoplastic, and fractured teeth:
   (1) Silver amalgam routinely for posterior teeth and primary anterior teeth.
   (2) Silicate cement routinely for proximal surfaces of permanent anterior teeth.†
   (3) Treatment of fractured permanent anterior teeth.
      (a) Parapical radiograms.
      (b) Pulp test.
      (c) Temporary sedative treatment.
      (d) A substantial restoration such as the ¾ crown casting, with window for esthetics.
   (4) The use of cast restorations for hypoplastic or badly broken down permanent teeth that cannot be restored satisfactorily by plastic filling materials.
   (5) The use of cast restorations for broken down primary molars on the basis of individual diagnosis.
   (6) Local anesthesia and cement bases to be used on the basis of individual diagnosis.
c. Pulp treatments:
   (1) Complete treatment for all conditions arising in the permanent anterior teeth, including root resection.
   (2) Pulpotomy for vital exposed pulps of posterior permanent teeth.
d. Lost permanent anterior teeth to be replaced by an acrylic palatal plate until a fixed bridge can be placed.
e. Lost permanent posterior teeth: The lost tooth or teeth may be replaced by an acrylic restoration, clasps being attached to adjoining teeth.
f. Treatment of mouth infections.
g. Extractions (Type of anesthesia to be determined on the basis of individual diagnosis).
h. Treatment of any condition requiring oral surgery.
i. Orthodontic treatment as required.

4. Period of Permanent Dentition (13–17 years) ‡

a. Examination, diagnosis, post-operative supervision of the cleft palate patient, prophylaxis, and the application of preventive measures to be the same as for the periods of the primary and mixed dentitions.*
b. Restorations, anesthesia, and bases for carious and injured teeth to be the same as for the period of the mixed dentition.
c. Lost permanent anterior teeth: Same treatment as for the period of the mixed dentition.

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* Orientation of child to dental procedures is to be included if required.

† The use of metallic fillings should be considered for the restoration of the lingual pits of incisors and the distal surfaces of cuspids.

‡ When a thorough diagnosis indicates the need for additional operative procedures, they may be utilized.

d. Lost permanent posterior teeth: Same treatment as for the period of the mixed dentition.

e. Pulp treatments:

(1) Anterior teeth: Same as for the period of the mixed dentition.

(2) Posterior teeth: Pulpotomy until approximately the 14th year, the exact age to be determined by the operator through radiograms and other diagnostic aids on an individual basis. Root canal fillings should be inserted routinely wherever and whenever indicated, on individual diagnosis.

f. Treatment of mouth infections.

g. Extractions and surgery: Same as for the mixed dentition period. (Now may include 3rd molars.)

h. Orthodontic treatment as required.

Minimal Dental Services:

It has been suggested that any program of dental care which cannot meet optimal standards should include as a ***minimum*** the following services:

(1) Examination and diagnosis.
(2) Prophylaxis.
(3) Application of preventive measures.
(4) Restoration of carious or injured teeth.
(5) Pulp treatment.
(6) Treatment of gingivitis and mouth infections.
(7) Extractions.
(8) Treatment of developmental anomalies of the mouth.

Order of Services:

It has been suggested further that within the group to be provided service, dental care should be rendered in the following order of decreasing emergency, assuming that sufficient examination, diagnosis, and treatment planning has been provided:

(1) Treatment of all acute or painful conditions of the teeth and severe infections or injuries of the soft and supporting tissues of the mouth.
(2) Treatment or removal, or both, of infected primary and permanent teeth which have passed the acute or painful stage, and provision of partial pulpectomies for young teeth with vital exposed pulps.
(3) Treatment of gingivitis or mouth infections which have passed the acute or painful stage.
(4) Repair of injured permanent teeth and those permanent teeth attacked by caries.
(5) Restoration of primary teeth attacked by caries.
(6) Root surgery for those infected permanent teeth which are of strategic importance to the denture, and in which infection can be eliminated and the root canals hermetically sealed.
(7) Simple prophylaxis.
(8) Orthodontic and prosthodontic care for those dentures in which the occlusion interferes with masticatory function seriously, or with the health of the supporting structures, or with the emotional stability of the child.
(9) Orthodontic supervision for those dentures in which the occlusion presents a serious potential threat to masticatory function, health of the supporting tissues, or emotional stability of the child.
(10) Provision of treatment for oral anomalies such as cleft lip and palate or mid-line supernumeraries, according to a treatment priority determined by the relative emergency of the condition.

SUMMARY

The evolution of the public health dental program has resulted in general agreement, based on current understanding of objectives and methods, that education, prevention, and treatment shall constitute acceptable phases of the program.

The scope of each of these phases is established in accordance with individual interpretation, policy, and practical limitations.

The definition or potential scope of any phase is directly related to a definition of dental health. A definition of dental health is offered for consideration.

In terms of this definition the items of dental treatment considered essential to accomplish the objectives of dental health are outlined.

Since realistic considerations may limit institution of these items of treatment, a minimal list of treatments is also presented.

A priority for rendition of treatment based on relative exigency is suggested.

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Arsenic in Soy Sauce

The San Francisco Department of Public Health, J. C. Geiger, M.D., Director, received notice on July 12 that soy sauce manufactured by a midwest packing company was contaminated with arsenic. According to Dr. Geiger, investigation indicated that much of the contaminated soy sauce had been blended and had reached the local market under various brands, 59 in all. Both retail and wholesale distribution of soy sauce was halted on July 14 and the public was warned of possible dangers. On July 19 the San Francisco laboratory reported studies of 59 known brands, and 32 of them were released for sale. The local press was advised of the names of the brands free of contamination. According to the department, of the contaminated material some of the specimens contained from 0.06 grains of arsenic per pint (As_2O_3) to as high as 10 grains per pint.

The source of contamination has been traced to a shipment of caustic soda from a chemical weed-killer producer to the soy bean sauce manufacturer through a broker. As soon as the sauce manufacturer heard of the illnesses traced to the soy bean sauce, samples withdrawn at various stages of preparation were analyzed. Samples taken at points following the addition of the caustic soda carried as much as 500 parts per million of arsenic. The manufacturer immediately supplied a complete list of all shipments which might have included the contaminated sauce, thus making it possible to trace suspected lots quickly.

A Method for Assessing the Sanitizing Efficiency of Quaternary Ammonium and Hypochlorite Products*

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THE effectiveness of hypochlorite solutions as sanitizing agents for the washed surfaces of food handling equipment is generally recognized, and these solutions are widely used for this purpose. More recently a number of "surface active" agents of the quaternary ammonium or cationic type have been advertised as substitutes for hypochlorites for this and other purposes. The present studies were undertaken in the hope of throwing some light upon the comparative efficiency of these two types of compound.

While the quaternary compounds show quite high values for phenol coefficient by the F.D.A. technique, the validity of this method has recently been called into serious question.[1, 2, 3] In any event, there is room for doubt as to whether such a technique is best suited to the task of evaluating the relative sanitizing efficiency of various solutions.

Some years ago, when faced with the problem of assessing the comparative germicidal speed of various chlorine compounds, a number of different techniques, including modifications of the F.D.A. method for the determination of phenol coefficient, were tried out. In an endeavor to approximate more closely the conditions under which a sanitizing solution has to do its work in actual practice, a glass slide method was finally developed which gave by far the most satisfactory results.[4] This method also permitted the use of very short periods of exposure to the germicidal solution, a point of considerable importance, since in many instances under practical conditions only a few seconds' contact is allowed. Preliminary tests showed that this glass slide technique, with slight modifications, could be used equally well with quaternary compounds, hence it was selected for the comparative tests to be reported in this paper.

DESCRIPTION OF GLASS SLIDE TECHNIQUE

In the glass slide technique, a 20-24 hour growth of the test organism on an appropriate agar medium is washed off and suspended in sterile distilled water. After filtration through a No. 1 Whatman paper the suspension is standardized to match the turbidity of a suspension of *Staphylococcus aureus* giving a plate count of 200,000,000 per ml. One ml. of suspension is then introduced into 60 ml. of a 1:10 dilution of sterile skim milk in a container of such dimensions that the depth of the liquid is 1½".

A previously sterilized slide is dipped into the seeded skim milk suspension so that the lower half of the slide is immersed. It is then carefully drained

* Presented before the Laboratory Section of the American Public Health Association, at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 12, 1946. Contribution No. 247 (Journal Series) from the Division of Bacteriology and Dairy Research, Science Service, Department of Agriculture, Ottawa, Canada.

against the rim of the container for approximately 10 seconds and placed upright to drain upon a pad of sterile filter paper in a specially constructed draining can. Sufficient slides to run the desired number of tests on a given dilution of a product are prepared consecutively, following which the tests are carried out before the films of diluted skim milk have dried over more than 25 per cent of the area.

Previous to preparing the slides, 100 ml. portions of the solutions to be tested have been prepared with sterile distilled water. These are placed in 100 ml. beakers and brought to the desired temperature in a water bath. The slide first prepared is then drained of any excess liquid on the filter paper, dipped into the test solutions and gently agitated for the required period, which usually runs between 1 and 20 seconds in the present studies. It is then quickly removed, dipped momentarily into a beaker of tap water to rinse off the adhering germicide and minimize bacteriostatic action, shaken sharply once to remove excess rinse water, placed in a Petri dish and the plate immediately poured with an appropriate agar medium. The remaining slides in the set are similarly treated in correct sequence. After an appropriate period of incubation, the colony count of each plate showing less than 500 colonies is made and recorded.

In the sanitizing of equipment, utensils, etc., we are usually more interested in reducing the numbers of organisms below a certain arbitrarily established limit than in complete sterilization. It was therefore decided to take as the end point approximately 99.9 per cent destruction. To arrive at this figure, control plates are prepared at regular intervals during each day's run by dipping sterile slides into a second container of diluted skim milk in which the concentration of test organisms is only 1/60 to 1/600 of that of the original skim milk suspension. These slides are drained in the same manner as those treated with the germicide, then dipped momentarily in fresh tap water before plating. The average colony count on these control slides, multiplied by the appropriate factor, indicates the approximate number of organisms present on the regular slides before treatment. By dividing this figure by 1,000 a value is obtained representing the number of organisms remaining after 99.9 per cent have been destroyed.

ADVANTAGES OF GLASS SLIDE TECHNIQUE

Compared with the phenol coefficient technique, the most obvious advantage to the bacteriologist is the avoidance of the "skips" and "misses" which are so commonly encountered with that technique. Although irregularities are sometimes encountered, there is generally a steady drop in count with increasing period of exposure or increased concentration of germicide. Similarly, replicate runs conducted a week or more apart have generally indicated a satisfactory degree of reproducibility with this technique, as indicated by the data in Table 1. After all, it is reasonable to expect better agreement between replicate runs where 99.9 per cent destruction is taken as the end point than where the end point is taken as the killing of the last, most resistant, cell.

Another important advantage is that the glass slide technique more closely approximates the conditions under which a sanitizing agent has to work in actual practice. It measures the ability to kill organisms present on a surface in a film of organic matter, rather than freely suspended in the germicide. Furthermore, as a result of gentle agitation of the slide while immersed in the germicide, any superiority of a given product in detergent action has an opportunity to display itself and, by mechanical removal of the film and its accompanying

TABLE 1

Germicidal Potency of Various Sanitizing Agents Against Micrococcus candidus at 20° C. Replicate Determinations Conducted a Week Apart

Product	Concentration p.p.m.	Period of Exposure (Seconds) 1 a	1 b	1 c	5 a	5 b	5 c	10 a	10 b	10 c	20 a	20 b	20 c
Roccal	200	+	++	++	4	0	1	29	0	2	8	0	0
	100	+++	+++	+++	33	29	45	13	2	5	13	2	2
	50	+++	+++	+++	++	++	+	26	25	6	23	13	5
R-2-L	200	274	++	++	0	8	2	1	4	0	0	2	0
	100	+++	+++	+	59	12	0	2	7	0	3	1	0
	50	++++	+++	+++	++	+	+	27	24	37	15	15	18
Hyamine 1622	200	+	++	+	18	0	215	23	4	293	4	2	344
	100	+++	+++	++	34	23	39	13	46	24	7	25	37
	50	++++	+++	+++	+	+	+	32	163	29	14	96	16
Emulsept	200	++	++	+++	25	127	6	8	48	1	10	41	3
	100	+++	+++	+++	+	++	+	21	34	17	41	14	1
	50	++++	++++	+++	+++	+++	++	+	+	+	27	67	7
Dalglish	200	++++	++++	+++	+++	+++	+++	++	++	++	166	++	433
	100	++++	++++	+++	+++	+++	+++	++	++	++	484	++	+
	50	++++	++++	++++	+++	+++	+++	++	++	+++	169	+	+
Klenzade X4	200	++++	++++	++++	+++	+++	+++	++	++	++	981	++	++
	100	++++	++++	++++	+++	+++	+++	+++	++	++	+	++	++
	50	++++	++++	+++	+++	+++	+++	+++	++	++	++	++	++

a — 99.9% destruction leaves 91 colonies
b — " " " 114 "
c — " " " 62 "

bacteria, to reduce the number remaining on the slide.

Finally, attention should be drawn to the flexibility of this technique. The test organism, temperature of testing, period of exposure, concentration of germicide, plating medium, etc., may all be varied to suit the needs of the investigator.

EXPERIMENTAL

The products selected for comparative testing were representative of those on the market in Canada at that time, and included Roccal and R-2-L, both 10 per cent solutions of alkyl-dimethyl-benzyl-ammonium chloride, Hyamine 1622, di-isobutyl-phenoxy-ethoxy-ethyl-dimethyl-benzyl ammonium chloride in powder form, and Emulsept, a 10 per cent solution of N(acyl colamino formyl-methyl)pyridinium chloride. For comparison, two hypochlorites were selected. One, Dalglish Liquid Bleach, containing about 12 per cent available chlorine, is widely used throughout Eastern Canada. The other, Klenzade X4, is a newer product, said to be buffered to lower the pH and to render it more stable.

Time will not permit a detailed presentation of the results of these studies. They have included evaluation of the comparative germicidal efficiency against each of the test organisms at 20°C., while with three of these similar comparisons have also been made at 45°C. In addition, the effect of adjusting the pH has been studied with both *Staphylococcus aureus* and *Escherichia coli*. To give a general idea of our findings, a Table 2 has been constructed showing the periods of exposure necessary to effect 99.9 per cent destruction of each of the test organisms with one of the three concentrations of germicide tested. While this presentation tends to magnify certain small differences, as compared with the tables containing the complete data, it still serves to indicate certain important differences between the two types of sanitizing agent. For example, it clearly shows that against *S. aureus*, *Micrococcus candidus* and spores of *Bacillus panis*, the hypochlorites are definitely less effective than are the quaternaries. Against the vegetative cells of *B. panis* they are approximately equivalent, while against cheese starter organisms the hypochlorites are definitely more effective. The results from tests with flat sour organisms (21 hr. cultures) indicated destruction of >99 per cent of the cells by Roccal within 5–10 seconds, and by Dalglish hypochlorite within 10–20 seconds. How-

TABLE 2

Periods of Exposure (Seconds) Required to Destroy 99.9 Per cent of Test Organisms at 20° C.

	Conc'n p.p.m.	Quaternary Ammonium Compounds				Hypochlorites	
		Roccal	R-2-L	Hyamine 1622	Emulsept	Dalglish	Klenzade X4
Gram-positive Species							
S. aureus	200	5	5	5	15	15	>20
M. candidus	200	5	5	5	7	>20	>20
B. panis — spores	1,000	3	1	1	15	>20	>20
— vegetative	100	5	5	1	5	1	5
Cheese starter	100	5	3	3	3	1	1
Flat sour organisms							
M 23	200	>40	..	..	..	>40	..
1503	200	>40	..	..	..	>40	..
1518	200	>40	..	..	..	>40	..
Gram-negative Species							
E. coli	200	15	10	>20	15	1	1
P. aeruginosa	200	5	5	8	8	1	5

ever, the number of spores present was so great that the 99.9 per cent end point had not been reached after 40 seconds' exposure. The sharp differences in resistance to quaternaries shown by Hucker to characterize the spore forms are not evident in the vegetative cells.

With the Gram-negative species, *E. coli* and *P. aeruginosa*, the hypochlorites are definitely superior, the advantage being greater than that in favor of the quaternaries against *S. aureus*. Incidentally, it is interesting to note that while other workers have reported *P. aeruginosa* as being much more resistant to quaternaries than is *E. coli*, our results with the glass slide technique have shown *Pseudomonas aeruginosa* to be the more easily killed. A possible explanation for this may be that the *P. aeruginosa* cultures contained a few highly resistant cells, so that, although 99.9 per cent destruction is accomplished in a relatively short time, yet the destruction of the last surviving cell may require a much stronger concentration or a longer exposure period than was necessary for *E. coli*. This point requires investigation.

Tests conducted against *S. aureus* at 45°C. indicated that there was some enhancement of germicidal activity of the quaternaries at the higher temperature, but the effect was slight compared with that noted for the hypochlorites. On the other hand, against *E. coli*, the quaternaries showed a more marked increase in activity at the higher temperature. Adjustment of the reaction to around pH 10 stimulated the activity of the quaternaries against *S. aureus* more than against *E. coli*; however, the effect was slight compared with that shown by the hypochlorites in solutions adjusted to pH 6.

Although it is not so evident from the data in Table 2, Emulsept was almost invariably less effective than were the other three quaternaries, while Klenzade X4 was similarly less effective than Dalglish.

It will be noted that the time required to destroy 99.9 per cent of the test organisms with the glass slide technique is a very small fraction of that required to effect complete sterilization with the F.D.A. technique or its modifications. Since in the glass slide technique the cells are present in a film of diluted skim milk, it seems unlikely that this difference is due entirely to a lesser amount of organic matter present than in the F.D.A. method. More probably it is due to (a) the smaller number of cells to be destroyed (varying between 8,000 and 160,000 per slide), and (b) the fact that while a very high percentage of the cells is usually destroyed within the first few seconds, an occasional cell survives for several minutes. The numbers present in the film in the glass slide technique are considerably higher than might be expected on the surfaces of washed food handling equipment and utensils,[5] while the amount of organic matter in the film of skim milk is also much greater. It would seem reasonable, therefore, to expect equally rapid destruction in actual plant operations.

In view of the recent evidence of strong bacteriostatic action displayed by some quaternary ammonium compounds in the F.D.A. technique,[1, 2] considerable attention was given to the possibility that bacteriostasis might affect the results obtained with the glass slide technique. It was found that with the higher concentrations (used against spores of *B. panis*), quite marked inhibition of growth of *S. aureus* resulted, even where treated slides had received the customary dip in tap water to reduce the carry-over of residual germicide. With a concentration of 200 p.p.m. the zone of inhibition rarely exceeded the area of the slide; with weaker concentrations it was scarcely noticeable. This bacteriostatic effect was confined to the three Gram-positive species tested, even 1,000 p.p.m. having no effect upon the Gram-

negative species. The bacteriostatic effect was usually confined to the area above and adjacent to the treated slide, the test organisms growing freely on the remainder of the plate. While this effect was quite evident on a crowded plate, by the time the number of colonies approached the 99.9 per cent end point it was usually difficult to see much evidence of bacteriostasis. Consequently, it is believed that any error introduced by the bacteriostatic effect is slight compared with that in the F.D.A. method, and it is unlikely that such error has influenced the results to a significant degree. From a practical standpoint, this effect may be regarded as an advantage in that the residual film of a quaternary solution on a treated surface could be expected to continue its activity against any remaining organisms.

SUMMARY

To recapitulate, the glass slide appears to offer certain advantages in the evaluation of the efficiency of various types of sanitizing agents. Quaternary ammonium compounds, like chlorine compounds, show differences in their relative potency. In general, the former are more effective against the Gram-positive organisms, while the hypochlorites tested show an even greater advantage against the Gram-negative species tested. While the quaternary compounds show some responses to favorable adjustments in temperature and pH, these are much slighter than those shown by the hypochlorites.

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ADDENDUM

Since this paper was prepared, the following modifications have been adopted: (a) instead of receiving only a momentary dip, treated slides are agitated in tap water for 5 seconds before being plated; (b) control slides are shaken vigorously 25 times in 100 ml. sterile physiological saline solution in a 4 oz. screw-cap jar, the slide itself is plated out and 5 ml. of the saline plated separately. From these the total number of organisms originally present on the slide is calculated and this figure used in determining the end point of 99.9 per cent reduction.

Congenital Defects in a Year of Epidemic Rubella*

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A SUPPOSEDLY benign disease suddenly assumed much more serious aspects, when Gregg[1] in 1941 first reported the relationship between rubella in the pregnant woman and congenital defects in infants. As evidence accumulated, a number of serious congenital defects appeared to be directly attributable to the occurrence of rubella in pregnancy. The Australian cases reported by Gregg and others occurred following a large outbreak in 1940 in an area where the prevalence of rubella had been low for a number of years. The accumulation of a large number of susceptible adults resulted in many pregnant women becoming afflicted simultaneously. Realizing that this same situation might be occurring in Massachusetts, but unrecognized because of its relative infrequency, a survey was planned to determine if such anomalies appeared to be resulting from rubella in this state.

SURVEY METHODS

The first step in this investigation was to send letters describing the problem to eighty well known specialists in the following fields: obstetrics, pediatrics, ophthalmology, and otolaryngology. All were asked whether they had observed in their practice specific defects in the new-born such as had been previously described, and which could be attributed to rubella in the pregnant woman. Replies were received in the affirmative from six of these specialists enumerating a total of 10 such cases. Although only a few cases were thus discovered, it was felt that the problem warranted further study.

The second and most important phase of the study was an attempt to analyze the problem from a statistical viewpoint. The year 1943 was selected for such a study for several reasons: Nearly 35,000 cases of rubella had been reported to the department during that year, nearly twice the usual incidence; it was recent enough for individual memories to recall important facts; the children would be old enough for the anomalies to have been recognized at the time of the study.

The approximate number of females who had rubella in Massachusetts in 1943 was estimated from the list of reported cases for that year. It was found that 5,085 females in ages 15–49 inclusive had rubella in 1943. Since only 1 per cent of girls 15 and 16 are married in Massachusetts, the omission of those under 17 decreased the number to be surveyed to nearly 3,000. A complete list of the females in the age group 17–49 was compiled from the original report cards sent in daily from local boards of health.

* Presented before the Epidemiology Section of the American Public Health Association at the Seventy-fourth Annual Meeting in Cleveland, Ohio, November 12, 1946

The notification of communicable diseases from the various communities in the state list the name, address, age, and sex of the individual so reported. Marital status is not usually given. Accordingly, our list of adult female cases contained no information regarding marital status. Realizing all of the difficulties which would be encountered in seeking information from these individuals, various approaches to the problem were attempted. First, four communities were selected which have large, active health departments, coöperating closely with the State Department. They were asked to investigate the cases listed for their communities. This did not prove to be a satisfactory method even in these communities because of the lack of properly trained personnel who could devote the necessary time to the problem. It would have been even less satisfactory in the smaller cities and towns in the state. A brief trial of collecting information personally by departmental employees disclosed that the method was too time-consuming. The only practicable method seemed to be to canvass the group by mail.

A small pamphlet was prepared describing in simple understandable terms the purpose of the survey and the reason for requesting the information. This pamphlet was mailed to each woman on the list, and a return postal card was enclosed which was to be filled out and returned to the department. Each postal card was marked with a code number corresponding to the name of the woman in our file, so that she could be identified without signing the card. The first question on the card asked if the woman was married at the time that she had rubella in 1943. If the answer was negative, the remaining questions were not to be answered. As might be expected, some who did not read the pamphlet and card carefully became irate and wrote sarcastic replies. Fortunately, the vast majority who replied appeared to have understood the purpose of the card, and filled it out satisfactorily. A second card was enclosed to be given to an acquaintance who had had rubella while pregnant, if any such cases were known. This card, of course, had to be signed and returned to the department in an envelope. A follow-up letter was sent out at a later date to those women who failed to respond to the first questionnaire.

As a third step in the investigation, a letter was sent to approximately 6,000 physicians in the state, and to several institutions for the care of defective children, asking for information that they might have on rubella during pregnancy. Since rubella is not well reported, it was thought that some unreported cases of the disease during pregnancy might be found in this way and that information might be obtained in regard to women who did not reply to the questionnaire. This portion of the survey is not yet completed.

RESULTS OF THE SURVEY

Table 1 shows the response to the survey by mail of the reported cases in females. No questionnaires were sent to women who were obviously college or nursing students or inmates of institu-

TABLE 1

Response to Questionnaire Regarding Rubella in Pregnancy Sent to Women Ages 17–49

Massachusetts, 1946

German Measles in females 17–49		3,068
Questionnaire not sent	234	
Not located	45	
No reply	1,625	
Total		1,904
Replied to Questionnaire		1,164
Error in reporting	19	
Not married	658	
Married but not pregnant	438	
Pregnant at time of infection	49 *	
Total		1,164

* Five other cases revealed by supplementary methods

TABLE 2

Cases of Rubella in Pregnancy Revealed by Mail Survey in Females Ages 17–49 Massachusetts, 1946

Case No.	*Year Reported*	*Month of Pregnancy*	*Defects in Child*	*Remarks*
1	1941	1	bilateral cataracts microcephaly	
2	1943	1	bilateral cataracts heart lesion	
3	1943	1	?	Aborted at 4½ months
4	1943	1	?	Aborted at 3 months
5	1943	1	none	
6	1943	2	none	
7	1943	2	?	Stillborn at term
8	1943	2	heart lesion	
9	1943	2	bilateral cataracts heart lesion	Term birth (wt: 3 lbs. 12 oz.)
10	1943	2	none	
11	1943	2	none	
12	1943	2	none	
13	1943	2	?	Stillborn at about 7 mo.
14	1935	3	deafness	
15	1943	3	none	
16	1943	3	none	
17	1943	3	?	Aborted at about 4 mo.
18	1943	3	none	
19	1943	3	none	
20	1943	3	none	
21	1943	3	none	
22	1943	3	?	Aborted during 3d month
23	1943	4	none	
24	1943	4	none	
25	1943	4	?	Aborted during 4th month
26	1943	4	none	
27	1943	4	feeding problem	
28	1945	5	none	About 2 months premature
29	1943	5	none	
30	1943	5	none	
31	1943	5	none	
32	1943	5	none	
33	1943	5	none	
34	1943	5	none	
35	1943	5	none	
36	1945	5	none	
37	1943	6	none	
38	1943	6	none	
39	1943	6	none	
40	1943	6	none	
41	1943	6	none	
42	1943	6	alternating strabismus	
43	1943	7	none	
44	1943	7	none	
45	1943	7	none	Stillborn at term (autopsy)
46	1943	7	none	1 month premature
47	1943	7	none	
48	1943	7	none	
49	1946	7	none	
50	1943	8	?	Stillborn during 8th month (no autopsy)
51	1943	9	none	
52	1943	9	none	
53	1943	?	heart lesion	
54	1943	?	none	

tions. This eliminated 234 names from the list. Of the 2,834 women to whom the questionnaire was sent, 1,164 (41 per cent) replied. Replies from the original questionnaire totaled about 25 per cent, the remainder being elicited by the follow-up letter. The errors in reporting were mainly in age or diagnosis.

Of the 1,164 women who responded

to the questionnaire, 438 (38 per cent) were married at the time of their infection; 49 (11 per cent) of those who were married were pregnant when they had rubella. In addition, 5 cases of rubella in pregnancy which occurred in years other than 1943 were brought to our attention; 2 were sent to us by local health departments, and 3 responded to the second questionnaire card mentioned above.

The 54 cases discovered in this portion of the investigation are presented in Table 2. We are unable to account for the small number of cases which were reported in the last 2 months of pregnancy.

The congenital defects reported in cases 1, 2, 6, 8, 9, and 53 are typical of those previously reported as following maternal rubella. The defects listed for cases 27 and 42 are both commonly found in infants, and their relationship to the maternal infection might be questioned. We have included them in this table as defects for several reasons: Swan, et al.[4, 5, 6] have reported several cases of defective infants following maternal infection in the second trimester of pregnancy; the same authors have reported strabismus among the defects found in their cases; several authors have mentioned the occurrence of feeding problems among their cases. No defects were found in this series following maternal infection in the last trimester.

In Table 3, it will be seen that, of the 5 women who had rubella during the 1st month of pregnancy, 2 aborted, 2 had defective infants, and 1 infant was normal; thus 80 per cent of the infants were either lost or defective. In the 2nd month, 2 infants were stillborn, 2 were defective, and 4 were normal, or 50 per cent were lost or defective. In the 3rd month, 2 aborted and 1 was defective, with 6 infants normal, or one-third of the infants lost or defective. In the 4th month, there were 1 abortion and 1 defective child, with 3 infants normal; an incidence of 40 per cent lost or defective. In the remainder of pregnancy there were: 1 minor defect in the sixth month; 2 stillbirths which occurred in the seventh and eighth months; 1 defective infant for which the month of pregnancy was not known. In the 54 cases, there were 8 defective infants and 9 pregnancies which terminated in abortion or stillbirth.

Only 628 replies have as yet been received to the questionnaires which were sent to physicians in the state. Of these, 39 had treated approximately 170 cases of rubella in women of childbearing age in 1943. Thirteen of these women had been pregnant at the time of their infection. Data on 4 of these cases were incomplete; 5 of the 8 cases

TABLE 3

Cases of Rubella in Pregnancy Revealed by Mail Survey in Females Ages 17–49 Massachusetts, 1946

Month of Pregnancy	*Normal Infants*	*Defective Infants*	*Abortion or Stillbirth*	*Total Lost or Defective*
1	1	2	2	4 (80%)
2	4	2	2	4 (50%)
3	6	1	2	3 (33.3%)
4	3	1	1	2 (40%)
5	9	0	0	0
6	5	1	0	1 (20%)
7	6	0	1	1
8	0	0	1	1
9	2	0	0	0
Unknown	1	1	0	1
	37	8	9	17 (31.6%)

TABLE 4

Cases of Rubella in Pregnancy in Massachusetts Study, Combined with Those Reported by Fox and Bortin and Aycock and Ingalls

Trimester of Pregnancy	No. of Cases	Defective Infants		Abortions and Stillbirths		Total Lost and Defective	
		No.	Per cent	No.	Per cent	No.	Per cent
First	40	13	32.5	7	17.5	20	50.0
Second	22	2	9.1	1	4.6	3	13.6
Third	14	0	...	2	14.3	2	14.3
Unknown	2	1	...	0	...	1	50.0
Totals	78	16	20.5	10	12.8	26	33.3

in the first trimester had defective infants, in 1 case there was an abortion, and only 2 infants were normal. The single case reported in the third trimester produced a normal infant.

We were disappointed that physicians failed to remember or report more cases of rubella in the second and third trimesters of pregnancy. It does not seem plausible that rubella selects women in the first trimester of pregnancy. Undoubtedly the knowledge that important defects occur during that period focused attention on those who were most likely to show abnormalities.

DISCUSSION

Although a large number of cases of congenital defects following maternal rubella have been reported, the majority of these have been discovered by investigating pregnancies which resulted in defective infants. This may have given a distorted view of the incidence of defective offspring from pregnancies during which the mother has contracted rubella. Two recent surveys have approached the problem with the purpose of determining the proportion of defective children which might be expected from such pregnancies. These surveys of Fox and Bortin [2] and of Aycock and Ingalls [3] included 15 cases. All of the defects observed were in instances in which the rubella had occurred during the first trimester of the pregnancy. Of the 11 cases which occurred in the first trimester, 3 showed defects, an incidence of 28 per cent, compared to 23 per cent in the present survey. A 4th infant was stillborn, giving a total of 6 (25 per cent) lost and defective infants, compared to 50 per cent in Table 3.

In Table 4, we have combined the 54 cases from this study, 11 cases from Fox and Bortin, and 4 cases from Aycock and Ingalls. The data are given by trimester rather than by month in order to include the largest possible number of cases. The total proportion of infants lost and defective for the three periods is: 50 per cent for the first; about 14 per cent each for the second and third. It is interesting to note in comparison that the data presented on the effects of poliomyelitis in pregnancy by Aycock and Ingalls show a somewhat similar proportion of lost and defective infants, namely, 56 per cent, 26 per cent, and 14 per cent for the three periods. However, the proportion lost by abortion and stillbirth after poliomyelitis is much higher, and the number of defectives much lower. The figures given in Table 4 for the total period of pregnancy are probably not a very close approximation to the true picture due to the small number of cases in late pregnancy. Undoubtedly, the lack of reported defects in late pregnancy causes observers to overlook instances of rubella late in the period.

With the exception of Aycock and Ingalls,[3] no previous authors have emphasized that abortions and stillbirths may result from infection of the pregnant woman with rubella. The frequent interruption of pregnancy by other more

serious diseases is well known. It is apparent from the data presented here that the interruption of pregnancy as a sequel to maternal infection with rubella is frequent enough to deserve further investigation. The number of abortions and stillbirths uncovered in our survey is as large as the number of defective children.

A definitive study of the effects of rubella and other diseases during pregnancy on the resulting child has yet to be done. Such studies would involve finding cases while the mother is ill with the disease, verifying the diagnosis and the stage of pregnancy, following the pregnancy to its conclusion, obtaining careful autopsies on all infants lost by abortion or stillbirth, and following up infants to the age of 12 to 15 years, if necessary, to catch all important abnormalities. This type of investigation would be of considerable value, but would take a number of years to complete. Meanwhile, it is necessary that estimates of the gross effects on the fetus of maternal disease during pregnancy be determined as rapidly as possible. As suggested by Fox and Bortin,[2] more surveys of this type are needed for rubella. The total of 78 cases so far reported, which have been collected on a comparable basis, give some indication of the incidence of defective infants to be expected following maternal infection with this disease. The addition of more cases from other similar surveys would greatly strengthen the inferences which can now be made. Except for poliomyelitis, no information is available as yet on the incidence of defects after other diseases, although several are known to cause such defects.

In spite of the striking incidence of abnormalities of pregnancy during the first trimester, we must be cautious in attributing a causal relationship to rubella for all the defects found in this survey. We can be sure that some of them would have occurred if the mothers had not had rubella. Comparisons are needed with outcomes of pregnancies not complicated by communicable diseases as well as with those complicated by other virus and bacterial diseases.

SUMMARY

1. The results of a survey of adult females who had rubella in 1943 to determine the effects of the disease on infants are outlined and discussed.

2. Of 54 pregnancies discovered in replies to questionnaires sent to females 17–49 years of age, infants with abnormalities were observed in 8, abortions or stillbirths occurred in 9. Eleven of the 17 abnormal pregnancies were in women who contracted rubella during the first trimester.

3. Of 9 pregnancies reported by physicians in response to questionnaires, only 3 produced normal infants. Eight of the 9 women, however, contracted rubella in the first trimester.

4. Caution should be observed in attributing all such defects in infants to rubella.

5. The need of more comprehensive surveys to determine the comparative incidence of abnormal pregnancies in other virus and bacterial diseases as well as abnormalities in pregnancies not complicated by communicable diseases is discussed.

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Public Health Aspects of Dehydrated Foods *

Food and Nutrition Section

SINCE the termination of hostilities, production of dehydrated foods has shown a decrease due primarily to cancellation of government contracts. Thus, production of dehydrated vegetables for the fiscal year 1945–1946 has been estimated at approximately 91,300,000 lbs.; this figure does not include production for army procurement. If this were included, the total would probably be about 100,000,000 lbs., compared with 196,041,000 lbs. for the fiscal year 1944–1945.

Production of dried eggs for 1943, 1944, and 1945 is given in Table 1.

TABLE 1

Dried Egg Production in the United States *

Year	*Whole* lbs.	*Albumen* lbs.	*Yolk* lbs.	*Total* lbs.
1943	252,903,000	2,093,000	6,976,000	261,972,000
1944	311,369,000	2,310,000	7,063,000	320,742,000
1945	96,988,000	1,710,000	7,164,000	105,862,000

* Bureau of Agricultural Economics, U. S. Dept. Agr.

Dried egg production (whole, albumen, yolk) during the first 5 months of 1946 amounted to 64,528,000 lbs., compared with 77,236,000 lbs. for the first 5 months of 1945.

Although production of dehydrated foods has shown a tendency to decrease in post-war months, it is still an important segment of the food industry. The committee has therefore deemed it advisable to bring together the more *pertinent* information published since the report[1] of the committee.

DEHYDRATED VEGETABLES

There have been no further publications on the bacteriological aspects of dehydrated vegetables since those cited in the committee's report in 1946.[1]

Considerable work has been undertaken on the sulfuring of vegetables (particularly cabbage, potatoes, and carrots) to preserve their keeping qualities and vitamin C content better.[2, 3] Sulfite does, however, destroy thiamine.[4] The Russians apparently had used the method before it was commercially applied in the United States, as evidenced by a report by Sisakyan just recently available.[5] In this connection, the committee Chairman has received from D. I. Spiridonov his book (in Russian) on "Concentrated Foods" which not only includes the Russian technique of dehydration, but their technological methods of preparing concentrated foods.[6]

The latest data relative to the nutritive value of commercially dehydrated fruits and vegetables have been set forth by Pavcek, et al.[7] Mallette and his coworkers[4] have also published a well planned investigation on the nutritive value of commercially dehydrated vegetables.

* Progress Report of the Committee on Foods (Except Milk).

COMMITTEE ON FOOD (EXCEPT MILK)
Organized 1932. Published reports: *Year Books* 1933–1934, 1934–1935, 1935–1936, 1936–1937, 1937–1938, 1939–1940, 1940–1941, *A.J.P.H.*, July, 1945, Mar., 1946.

Mahoney, et al.[8] have carried out experimental work on the vitamin content of canned, frozen, and dehydrated peas. The peas were laboratory processed. After 6 months' storage (temperature not given) of the dehydrated product, vitamin C levels amounted to 20 per cent of the original content; when stored under carbon dioxide, the peas had a higher level of vitamin C than when stored in air or in a vacuum. Vitamin C retention on the basis of dry weight, of the stored products, after cooking was 19 per cent as compared with the original content. The dehydrated peas retained about one-half of their original thiamine content during 6 months' storage. A recent paper by Mallette, et al.[4] indicates that commercially dehydrated cabbage, white potatoes and sweet potatoes, when stored for a year maintained their vitamin potency, with the exception of vitamin C. Patton and Comin[9] stored dehydrated foods in sealed and unsealed containers for 6 months at 75–80° F. They obtained no consistent effect on the loss of carotene and thiamine in peas, corn, wax beans, peaches, and plums during storage with different types of containers. Carotene was lost more rapidly than was thiamine.

DRIED EGGS

Bacteriological workers in this field have concentrated their efforts on the study of organisms of the *Salmonella* group. The public health significance of this group has already been discussed at length.[1] Winter and coworkers in a recent paper[10] determined pasteurization times and temperatures necessary to destroy different *Salmonella* types in liquid whole eggs. It was found that these organisms were not difficult to destroy. *S. senftenberg* and *S. cerro* were found to be the most resistant types, and *S. pullorum* the least resistant. The resistance of *S. senftenberg* differed with the strain. These workers found that *Salmonellas* of the types *S. pullorum, S. oranienburg, S. montevideo, S. tennessee, S. anatum, S. bareilly, S. typhimurium, S. meleagridis, S. london, S. newington, S. derby, S. rubislaw, S. oregon* and *S. kentucky* were destroyed in liquid whole egg at 150° F. within 0.3 minutes; at 148° F. 0.8 minutes; at 146° F. 0.8 minutes; at 144° F. 1.2 minutes; at 140° F. 2.6 minutes, and at 138° F. within 3.7 minutes. At the higher temperatures of 148° and 150° F. there would seem to be some danger of film formation in the pasteurizer. Payawal, et al.[11] found that the region of denaturation of liquid whole egg, as determined viscometrically, occurred within the range of 132.8° F. to 150.8° F. Above 163.4° F. whole egg coagulates almost instantaneously.

McFarlane, et al.[12] have presented data and have discussed the bacteriological methods used in the examination of egg samples, and conditions which may affect bacterial counts during handling and processing. In a later paper[13] these workers indicate measures of sanitation necessary for the production of a clean dried egg product.

Although there are no bacteriological standards for dried egg, as pointed out by McFarlane and coworkers[12] agencies of the U. S. Department of Agriculture concerned with the production and purchasing of dried eggs are encouraging manufacturers to produce a commodity having a plate count (72 hr. incubation at 32° F., using tryptone-glucose-extract agar) under 300,000 organisms per gm; a direct microscopic count under 15,000,000 per gm., and with *Escherichia coli* absent in 0.001 gm. A direct count of 10,000,000 per gm., or under for a high quality powder is in accord with observations of Bartram[14] and of Lepper, et al.[15]

DEHYDRATED FISH

As pointed out in the committee's last report,[1] there is no commercial

production of dehydrated fish in the United States. Considerable work has been undertaken in Great Britain on fish dehydration. The results of the bacteriology of dehydrated fish have recently been published by Shewan,[16] who found that a dehydrated product made from good quality material under reasonable hygienic conditions was not sterile but might contain up to 100,000 organisms per gm. The flora consists chiefly of micrococci, and of the cocci growing at 37° C., 0–29 per cent are coagulase-positive and hence potentially capable of producing enterotoxins. This is of considerable public health importance because the most suitable way of utilizing dehydrated fish is by incorporation with potatoes in the form of fish cakes. Since starch media are excellent for enhancing the production of staphylococcal enterotoxins, and since Shewan found that growth occurs in such fish cakes even at 15° C., it would appear that cakes made from dehydrated fish should never be kept unfried in a warm room, but should be cooked immediately.

Tarr[17] has recently published results of his latest work on the microbiology of dehydrated fish. His data indicate that precooked fish, during dehydration, becomes contaminated with bacteria, molds, and yeasts. Mold development was apparent in dehydrated fish stored at 25° C. when the moisture content of the product became 16.8 to 18.3 per cent. Mold also developed, although not visible macroscopically, at moisture contents of 13.2 to 13.6 per cent. In two samples of 19 to 19.7 per cent moisture, the number of viable bacteria decreased sharply during storage, while a third sample showed a slight apparent increase. Both total volatile base and trimethylamine increased markedly in dehydrated fish stored at certain humidities at which viable bacteria and molds decreased.

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Vol. 37

American Journal of Public Health
and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 37 October, 1947 Number 10

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ADMINISTRATIVE PROBLEMS OF INDUSTRIAL MEDICINE

THE Special Review Article presented in this issue by Dr. L. J. Goldwater opens up what is perhaps the most complex and difficult problem to be found anywhere in the wide field of health and medical administrative policy; and the ultimate answer is, as yet, far to seek.

There are at least seven more or less distinct functions involved in the promotion of industrial health which may be listed as follows:

1. The provision of a healthful environment, including not only protection against specific accident and poison hazards but sanitary facilities, air conditioning, illumination, and other conditions essential for health and efficiency.
2. The education of the employed individual in the general principles of personal hygiene, particularly as adapted to the specific conditions of his employment.
3. Preëmployment examination to determine the suitability of a given individual for his specific task.
4. Prompt diagnosis of new conditions requiring medical attention, whether of occupational or non-occupational origin.
5. First aid for such conditions as arise suddenly within the plant.
6. Treatment of disease, on a non-emergency basis.
7. Rehabilitation of the individual who, on account of partial disability, may require special preparation for and adjustment to, productive activity.

For the provision of these seven types of service, there are four different agencies in the picture: industry, labor, the medical profession, and the public; and any two or more of these agencies may coöperate in solving parts of the problem. The possible complexities of administrative relationship stagger the imagination.

In the past, enlightened industry has taken the lead in this field. In some large plants all seven of the functions listed are performed under the direction of management and with excellent results. In most large industries, some provision is made for the first five of these functions. Of late, organized labor has assumed an increasing role. The inclusion of health and welfare clauses in labor-management agreements is likely to become routine practice in many well organized industries, and some of the stronger unions are already building up highly developed medical services for their members under labor auspices,

creating new vested interests which may be difficult to reconcile with a broad and all-inclusive program.

So far as the medical profession is concerned, it is difficult, as Dr. Goldwater points out, for the individual practitioner to fit into a comprehensive plan; and it is clearly impossible to visualize any such program on a fee-for-service basis. Prepayment is essential to adequate medical care for the middle economic groups of our society; and such care can only be provided with economy and efficiency on the basis of group practice. By the adoption of these two devices the medical profession can render the real service of which it is capable.

The public comes into the picture in two ways. We have pointed out that large industries have, in certain instances, come close to solving the problem by themselves. For the small industry, however, such a solution is impossible. Only through the leadership of the health department (or, in some communities, by that of a university medical center) can the small factory receive the preventive health and medical service which it so sorely needs. We look for substantial progress along this line as the health departments of our cities awake to their opportunities. The second contribution which the public will ultimately—in spite of misguided opposition—make to this picture will be through the passage of legislation for the prepayment of the costs of medical care.

Management, labor, the medical profession, and the public all have their stake in the outcome; and none of them can be left out of an ideal program. Yet, after all, the individual worker is at the center of the picture. He, or she, is a human being. He, or she, needs coördinated personalized health facilities, health education, and medical care. We must not cease to strive for a unified program directed toward an individual who is the same individual, whether within the walls of the factory or at home. Furthermore, the industrial worker is generally a member of a family; and his health care and health counseling should be correlated with that available for the other members of the family of which he forms a part.

There is a certain essential distinction between the first two and the last five of the specific functions listed above. Provision of healthful conditions within the factory walls and educational adjustment of the individual worker to those conditions are primarily problems of the industrial community itself. We may perhaps visualize as a promising avenue of approach a program in which a specialist in industrial hygiene would be primarily in charge of these functions. In a large plant he would be responsible to management—or, better, to a joint committee representing management and labor. In small plants, he might be an employee of the local health department, preferably with an advisory committee representing labor and management.

The other five functions, from preëmployment examination at one end of the chain to rehabilitation at the other, involve problems primarily related to the individual worker. They could ideally be performed by a group practice unit of the medical profession acting under a prepayment plan. The preventive and curative aspects of the program should be tied together, however, by the cooperation of the specialist in industrial medicine as an associated member of the group practice unit. Where the group practice unit has sufficiently far-sighted medical administrative leadership, the group might, on its own initiative, supply to the industry its preventive as well as its curative service.

There is no single, perfect solution of this problem now in sight. There is rather a challenge to the inventiveness of management, labor, the medical profes-

sion, and the public to find empirically the best plan that will fit a given local situation. For management and labor, the need for coöperation in the meeting of a common problem is called for rather than insistence on vested interests. For the medical profession, it seems certain that the principles of group payment and group practice must be essential to any sound solution. For the public health authorities, leadership in research, formulation of reasonable standards of attainment, and assistance to small industries, where desirable, would appear to be the appropriate role.

THE PROBLEMS OF CHRONIC ILLNESS

THE development of a broad and comprehensive program for dealing with chronic illness is clearly one of the outstanding challenges to the public health worker of today; and we are printing in the present issue of the *Journal* what is probably the clearest and most authoritative brief analysis of this problem which has yet been formulated. The joint statement of recommendations on "Planning for the Chronically Ill" has been prepared by a conference committee representing the American Hospital Association, the American Medical Association, the American Public Welfare Association, and our own Association. We commend it to the serious consideration of our readers.

The first step in this program is, of course, prevention. Tuberculosis and cancer are obvious examples of diseases which can be checked before they become chronic. The report does not mention streptococcosis, but we suspect that the streptococcus and the treponema lay the groundwork for many a case of circulatory disease in later life; and that the health officer who does not conduct a special program for the control of streptococcal diseases is missing a good bet.

The second essential is provision of hospital facilities for the care of chronic diseases at the stage when intensive medical care is needed; but a type of medical care with facilities for physiotherapy, occupational therapy and the like which a general hospital very often lacks and which, on the other hand, does not require much of the equipment which makes the general hospital so costly. Recognition of the fact that chronic diseases require facilities of a special kind has, however, too often led the unthinking to propose chronic disease hospitals set up as completely independent institutions, often in remote and isolated areas. This is a most unwise course. It deprives the chronic patient of the best type of medical service and it deprives the medical staff of the general hospital of invaluable experience with this most important group of diseases. The chronic disease hospital should be a specially equipped unit; but, as the Joint Report points out, "Hospital facilities for long-term illness should be built in the very closest relation to teaching centers and general hospitals."

A third essential element in the program is the nursing home for the type of patient who does not need active and continuous medical care but who cannot—for one reason or another—be cared for in the dwelling. For this purpose, public and private nursing homes should be provided under a system of licensure and inspection which is far more intensive and constructive than that now generally in force. Too often the licensing of nursing homes is carried out by state and local health departments in a purely perfunctory fashion, as a routine response to laws which require licensure of institutions which the health officer considers as unimportant, if necessary, evils.

Finally, the Joint Report considers that "the majority of persons who are chronically ill can best be cared for in home, office, and clinic." Here, the major need is for expansion of public health nursing to approach the essential ratio of one nurse per 2,000 population and for the improvement of the quality of nursing service provided. A specialized supervisor for this type of bedside care is perhaps as important as a specialized supervisor for tuberculosis nursing.

The Report emphasizes the vital importance of treating this whole subject as a branch of medicine and public health and not as a form of poor relief. One system of medicine for the poor and another system for the rich is an intolerable anachronism. It is impossible to build up a sound institution for the care of chronic illness, or to attract patients to such an institution if any suspicion of indigence is involved. We doubt whether this difficulty can be overcome until such services are transferred from welfare auspices to those of the health department or the community hospital.

It is a most favorable omen for such planning that the four major professional organizations concerned with this field should have united in so admirable a report. We congratulate our own Subcommittee on Medical Care for its contribution to this important task.

TRAINING HEALTH WORKERS FOR LATIN AMERICA

AT a meeting of the Institute of Inter-American Affairs last winter, Dr. T. I. Gandy, Chief of the Institute's Field Party in Chile, presented a review of the progress made in training health workers for our southern Sister-Republics which was at once a record of distinguished past achievement and a challenge for the future.

Dr. Gandy points out that "Following the Conference of Foreign Ministers held in Rio de Janeiro in 1942, the republics of Central and South America and Mexico suddenly realized that one of the largest inter-American programs in public health was under way. Within a short time health centers, hospitals, sewerage and water works were being constructed from Mexico to the land-locked islands of southern Chile, and from the Atlantic to the Pacific. The mighty Amazon basin was explored and control measures were instituted for malaria, leprosy, yaws and other tropical diseases. The personnel of the Institute of Inter-American Affairs was soon to be found in every country and climate of this hemisphere in their effort to reduce diseases, increase health standards, and to bring to many people their first knowledge of the meaning of public health."

The scarcity of trained professionals in the various fields of public health was immediately realized; and, through the leadership of Dr. George C. Dunham, a Training Division was organized by the I.I.A.A. for the purpose of bringing selected candidates to various institutions of higher education in the United States. During the past four years, hundreds of professional men and women from Latin America have received training here under its auspices and, upon return to their respective countries, have been appointed to key posts in the public health field.

This training program has, of course, been on a temporary emergency basis. It will always be true that a few mature men will benefit greatly by training in a foreign country; and there should be facilities in our schools of public health

for exceptional cases of this kind. Dr. Gandy, however, points out that, for reasons of economy, to minimize language difficulties, and to adapt the educational process to local needs and social conditions, the great majority of health workers for Latin America should be trained in Latin America. Particularly is this true for the preparation of public health nurses, health educators, sanitarians, laboratory workers, and various types of auxiliary personnel.

Dr. Gandy believes that such local training facilities should be developed within the framework of existing national public health services, and that these services should subsidize both the schools themselves and the students, where necessary. These students, he suggests, should be selected, at first, primarily from the ranks of those already employed in the official health departments.

An excellent example of what may be accomplished along such lines is offered by the advances made in Chile. Here, the National Health Service, the Rockefeller Foundation, and the Chilean affiliate of the I.I.A.A. have developed a comprehensive training program parallel with its advances in administrative health work. With the counsel and leadership of Dr. Hernan Romero, head of the School of Public Health, and with many instructors who have received special postgraduate training in the United States, 42 medical health officers have been graduated from the course designed for them; while sanitary and food inspectors, laboratory workers, statisticians, and health educators have fulfilled courses leading to certificates in their special fields. All in all, 244 students have received instruction in the school, while 123 public health nurses and 42 nursing aides have completed special training courses offered in two health centers devoted specifically to that purpose.

In Puerto Rico, there is a more modest, but most promising, development of field training facilities.

We trust that more extensive provisions of this kind may be made in the various large centers of Mexico and Central and South America. It is only through local study and training centers, under national auspices and using the national language, that the health knowledge accumulated in English-speaking countries can be translated—not merely into the language of Latin America, but into the social life and the traditions of Latin America.

BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted. All books reviewed in these columns may be purchased through the Book Service.

The Development of Modern Medicine—*By R. H. Shryock. New York: Knopf,* 1947. 457 pp. Price $5.00.

The well known medical historian author has given us a packed volume of condensed medical and cultural record of the past 350 years, abundantly documented and presented in scholarly language by a master bookmaker and printer.

It will not be thought unfriendly or snobbish to suggest that there is little of any new matter not already familiar to well educated physicians or to students and practitioners of contemporary society and its origins.

The "attempt to portray certain major aspects of medical development against the background of intellectual and social history in general" varies in its success among the twenty chapters. Rare judgment and wide familiarity with original sources are evident in a text which condenses the medical story of 1600 to 1800 in the first six chapters. These give fairly routine basic matter selected for the present special purpose. The next four chapters on Sciene in the Romantic Age, Medicine and the Basic Sciences, Medicine, Mathematics and the Social Sciences, and Emergence of Modern Medicine, are excellent in spirit, outlook, and suggestiveness. Familiar matter of less value is presented in Chapters XI–XV although the thread of thoughtful analysis and social interpretation is well maintained. The last five chapters are perhaps less satisfying because they deal with matters of such recent origin and implications that they savor more of contemporary journalism than of history, and yet all the facts are reliable and important, though less capable of final evaluation than those of earlier half centuries.

It is rare indeed to find an error of name and yet on one page the discoverer of cocaine is spelled once with an *o* and five lines below with an *a* (Koller and Kaller). The author seems to play casually with two spellings for the same word *virulency* and *virulence* without apparently intending any distinction or preference.

Those who study, teach, write, or think in the medical-social field will turn often and eagerly to this almost pocket manual of medical history in the making.

Physicians will welcome so correct and balanced a presentation. The educated laity will be better patients and fairer judges of their physicians if they indulge themselves in this good book.

HAVEN EMERSON

Fleas of Western North America—*By Clarence Andressen Hubbard. Ames, Iowa: The Iowa State College Press,* 1947. 533 pp. Price $6.00.

A book which has attracted the attention of *Time Magazine* deserves consideration and review, and glance by the non-professional leaves no doubt that Clarence A. Hubbard has made an important contribution in bringing the systematics of western fleas from the dusty shelves of the specialized library to the workbench of the student of external parasites. The epidemiologist or experimenter with vectors conveying diverse human and animal infections will find here in convenient form a summary of the scattered literature on most of the *Siphonaptera* thus far found in the West. Identification keys have been devised for groups of fleas that previously had none. The data on the biology, morphology, types of hosts, seasonal distribution and abundance will prove very valuable, although the

entomologist may not always be willing to accept the classifications. However, anyone even superficially familiar with the subject will appreciate the tremendous amount of effort which Dr. Hubbard singlehandedly has expended, under a great deal of hardship and personal sacrifice, in making the field collections and laboratory preparations.

The description of the species are clear and well illustrated by a wealth of original camera lucida drawings, which are, however, crowded together so closely that it is often difficult to determine the relationship of a specific name with its respective sketch (see pages 237, 241, 261, 276, 285 and 357). A more detailed account of the internal morphology of fleas and methods of culturing in the laboratory would have been of value. The host index to western fleas and the rapid checking index, which covers over 127 pages, facilitate use of the book. Since the subject is not static, it is not expected that the book will remain complete, but in its present form it is not up-to-date with respect to references. For example, the new subspecies, *Carteretta carteri clavata*, reported by Good in 1942 from Nevada, is not mentioned. Besides making the list of known fleas incomplete, such an omission also weakens the data on geographical distribution. Many more omissions will be found by the specialist.

It is rather unfortunate that the author attempted a presentation of data on the medical importance of fleas. His familiarity with the literature concerning this aspect is, at best, so sketchy that even as a "commentary" it must be considered inadequate. For example, the demonstration of *P. pestis* in *Echidnophaga gallinacea* in 1941 is not mentioned, and the role of fleas in sylvatic plague has been completely overlooked. Furthermore, the impression is given that fleas transmit *Bact. tularense*, although transmission experiments by the American entomologists, Prince and Burroughs, have repeatedly failed. Most disconcerting are the recommendations for the medieval use of salt, napthalene, kerosene, or engine oil in the control of fleas (page 27). Recent experiences with the remarkably effective DDT have apparently made no impression on the author.

K. F. MEYER

Social Security—*Selected List of References on Unemployment, Old Age and Survivors', and Health Insurance, Bibliographical Series No. 78—By Matthew A. Kelly and Hazel C. Benjamin. Princeton: Princeton University Press*, 1947. 62 pp. Price, $.75.

The Department of Economics and Social Institutions of Princeton University has done a real service in preparing this bibliography of references on the various aspects of social security.

In the discussion of the three types of social security insurance: unemployment, old age, and health, the subject is divided into general problems and philosophy, United States experience, and legislation and experience in foreign countries. This is valuable reference material for those interested in any aspect of the social security problem.

MARTHA LUGINBUHL

The Co-Operative Process Among National Social Agencies—*By Ray Johns, Foreword by Shelby M. Harrison, General Director, Russell Sage Foundation. New York: Associated Press, 1946.* 290 pp. Price, $3.00.

Whether you, as a public health worker, believe in a little coöperation, a lot of it, or none at all, you owe it to yourself to read with care this treatise on the coöperative process.

It is based on the recent war experiences in coöperation and on current opinion. The author's background, as former Associate Director of USO, leaves him with few illusions as to the problems involved in getting agencies,

their board members, executives, and staffs to work together for a common goal that transcends their individual interests.

Program content is omitted. The book wisely limits itself to the keen analysis of a "process." What is presented about national social agencies applies, therefore, with equal force to national health agencies and to local agencies as well. You will be impressed with the logical, well ordered approach and the objectivity of this study and report. The style is quite unemotional. One cannot escape the feeling that he is reading an account of a difficult exploratory surgical operation—from incision, through probing and dissection, to final closure and prognosis. As a consequence, it is definitely not for the "hammock" reader; but to all persons who are devotedly and unselfishly seeking to improve the health of all people and all communities through our public health agencies, this book is "must" reading. JOHN W. FERREE

Public Agency-Council Relationships—*A Study published by the Health and Welfare Planning Department. New York: Community Chests and Councils,* 1946. 47 pp. Price, $.75.

The Department, through its Secretary, Violet M. Sieder, presents the results of a study of the relationships of public welfare organizations to councils of social agencies in 113 communities of various sizes located in different parts of the United States.

The value of publicly supported health and welfare organizations, as well as private ones participating on an absolutely equal basis in privately supported welfare councils, is demonstrated.

The advantages to both the tax supported organizations and to public officials as well as to the privately supported organizations in the community, are evident. The author criticises the limited efforts made to maintain complete coöperation between public and private agencies in welfare councils. The volume stimulates a desire for closer and more effective coöperation between councils and public officials.

Seven questions which public welfare agencies and councils could well ask themselves are outlined in the appendix.

Sub-headings I, II, III, etc., might well have been more prominent.

HOWARD W. GREEN

Public Health Nursing Functions In The School Health Program—*Prepared by the Minnesota State Department of Health and the State Department of Education, December, 1946.*

Public Health Nursing Functions in the School Health Program is a compilation of material with dates of sections ranging from August, 1943, to December, 1946. Section titles are "Relationships to Health Councils," "Delineating Responsibilities between Nurse and Teacher," "Evaluation of School Health Service Program," and "Appendix."

Two state departments are given credit for preparing the material but participating individuals or divisions are not identified. The affiliation of the secretary and executive officer who signed the foreword is not revealed.

Lack of consecutive page numbering throughout, and the treatment of the same subjects in more than one section without adequate cross-references are disturbing features. An immature nurse probably would be confused by the arrangement.

An interpretation of how the school administrator functions in directing the school health program is lacking.

Good suggestions for promoting school health education are offered in the various sections, particularly in the appendix. Unfortunately, the casual organization of the material fails to give the anticipated clear-cut picture of how

school nursing may become an integral phase of school health program. For contrast, the reader is referred to sections on school nursing in the *Minnesota Manual for Public Health Nurses.*

LULA P. DILWORTH

Laboratory Control of Water Purification—*By Charles R. Cox. New York: Case-Sheppard-Mann,* 1946. 386 pp. Price, $4.00.

This volume is designed for the assistance of technical personnel in water works laboratories. It is true that untrained laboratory workers are frequently employed, many of whom become proficient in water analysis but who lack fundamental chemical and bacteriological training. The author has attempted to supply this and has done an excellent piece of work. The book should be useful as well to the trained worker who frequently desires to know more of the chemical reactions involved in the various analytical procedures than is given in *Standard Methods for the Examination of Water and Sewage.*

In general the procedures given are those in use in most water laboratories but there are some additions, presumably, from the author's laboratory.

The volume would be more useful if more original references were cited. Probably these were intentionally omitted. *Standard Methods* is mentioned a few times, Whipple's *Microscopy of Drinking Water* once, one *Journal* reference is supplied, and the Public Health Service standards are referred to. A few phrases are confusing—such as "pathological diseases," and the description of the food supply of bacteria—but most of the book is clear and as concise as is consistent with its purpose.

JOHN F. NORTON

National Health Insurance in Great Britain 1911–1946—*By R. W. Harris. Washington, D. C.: Public Affairs Press,* 1946. 224 pp. Price, $3.25.

The author of this volume has been intimately associated with the British health insurance system, in one capacity or another, since the Health Insurance Bill was presented to Parliament in 1911. At one time an assistant secretary in the Ministry of Health, he is now Chairman of the Medical Service Subcommittee of the London Insurance Committee.

A great deal of important information is contained in this review of British experience. The early history of the Friendly Societies is presented, together with a detailed description of the types of societies and their subsequent development under National Health Insurance. The very high costs of cash sickness benefit administration by approved societies are contrasted with the low costs for administering medical benefits through the insurance committees. Interesting data are presented on patient-doctor relationships, including several case histories illustrating the types of problems dealt with.

Although the volume suffers from poor organization, it represents a valuable contribution to the literature on health insurance and an excellent source for factual data.

MILTON TERRIS

Tuberculosis As It Comes and Goes—*By Edward W. Hayes, M.D. (2nd ed.). Springfield, Ill: Thomas,* 1947. 220 pp. Price $3.75.

This is a small book of 200 pages written in non-technical language especially for tuberculosis patients and their families. However, it contains valuable factual and inspirational material for tuberculosis workers, including physicians. The author, being a man of wide experience in the treatment of tuberculosis, stresses individualization.

Dr. Hayes answers many of the questions which the average patient and his

relatives wish to ask the doctor. It is noted, however, that he does not mention streptomycin or BCG.

The book can be commended for its conciseness, fairness, and common sense attitude. Apt quotations sprinkled through the pages enhance the readability of the text. There are numerous sketches illustrating various types and stages of the disease before and after treatment. These probably are more intelligible to the layman than reproductions of x-ray films would be.

Especially noteworthy are 2 chapters at the end by Laurence de Rycke, Ph.D., on "Suggestions to Patients," and "Suggestions to Visitors." These chapters alone are worth the price of the book. JOHN H. KORNS

Veterinary Bacteriology—*By I. A. Merchant, D.V.M., Ph.D., C.P.H. (3rd ed.) Ames, Iowa: Iowa State College Press,* 1946. 633 pp. 137 illus. Price $7.00.

"Some textbooks of bacteriology include sections which have been omitted purposely from this one. A section on pathogenic protozoa has not been included because such micro-organisms are logically studied in courses of animal parasitology in Colleges of Veterinary Medicine. . . . Laboratory methods of milk and water analysis are completely described in manuals of standard methods published by the American Public Health Association. Inclusion of such methods in this text would be superfluous."

Such, quoted from the preface to this third edition is self-explanatory. Whether such omissions can be used as a basis for any adverse criticism pertaining to the book can be entirely a personal opinion.

The author's decision to use "alexin" fixation instead of "complement" fixation is explained in the chapter "Cytolysis and Alexin Fixation" (Page 196); "The term complement fixation originated with Ehrlich. He believed that the complement was united to the antigen by the amboceptor, thereby he differed considerably with Bordet who thought the union was due to the action of amboceptor, or sensitizer, upon the antigen. In light of present day knowledge the explanation of Bordet is more acceptable."

Here, again, personal opinion can be the basis of critical comment. Certainly the term "alexin-fixation" does not appear in current literature such as *Venereal Disease Information* (Federal Security Agency, U.S.P.H.S.). The term "alexin" appears *only as a footnote* in a standard reference book pertaining to serology.

The Index of the book contains omissions and some errors among which are:

1. There is no mention of Aschoff or the reticulo-endothelial system, although a brief mention appears in one paragraph on page 209 of the text.

2. There are confusing index mistakes such as "Breed, R. S. 287" which should have been page 288; "Mangold 261" is found at the top of page 260.

3. The index does not mention agglutinin absorption; the text does mention it, briefly, in a paragraph on page 185.

However, the errors are slight; while the omissions can be satisfied by reference to other textbooks.

The type is good, the printing good, the illustrations good; the text sustains interest. R. V. STONE

The Principles and Practice of Medicine (Osler)—*By Henry A. Christian, M.D. (16th ed.) New York: Appleton-Century,* 1947. 1539 pp. Price, $10.00.

Osler's Principles and Practice of Medicine as revised and edited by Christian under the above title has been a standard text now for 55 years. An excellent chapter by Carr has been added tracing developments in the history of medicine as reflected in these

16 editions since 1892. The present edition has been extensively rewritten so that more than 900 of the 1400 pages have been entirely reset. Public health workers will find the text succinct, inclusive, and up to date. It is inevitable that in such a condensed treatise as this there should be conclusions that will be challenged by public health physicians as, for example, the mass prophylaxis of scarlet fever by sulfa drugs. It could also be said that the description of modified takes from cowpox vaccine is not clearly presented, and there is lacking a desirable link in the descriptions of communicable diseases with the officially adopted and international report on this subject. Nevertheless it seems doubtful whether for public health libraries a better single volume can be found in the English language.

REGINALD M. ATWATER

Methods of Vitamin Assay— *By The Association of Vitamin Chemists Inc., Chicago. New York: Interscience Publishers, Inc.,* 1947. 189 pp. Price, $3.50.

This text, consisting of nine chapters, has resulted from free discussion and exchange of ideas of the members of the Association, who edited this volume. The methods described are the result of the pooling and interchange of information on analytical techniques, thus representing the combined knowledge and experience of many persons. The background assumed is that of a laboratory technician with limited training in quantitative analysis. The scope of the book is limited to methods that have been successfully applied to a variety of foods. Revisions are planned by the Association from time to time, whenever conditions so indicate.

Chapter 1 gives consideration to the question of sampling for vitamin analyses. Chapters 2 to 7 considers in the greatest detail the best suited method for the assay of vitamin A, carotene, thiamine, riboflavin, niacin, and ascorbic acid. In Chapter 8, selected reference to other vitamin methods are listed. Finally, Chapter 9 discusses the use of check samples in control of vitamin methods.

With this excellent start, analysts may look forward to future editions of the Association of Vitamin Chemists with interest. HENRY T. SCOTT

Milk and Food Sanitation Practice— *By H. S. Adams, B.Sc. New York: The Commonwealth Fund,* 1947. 311 pp. Price, $3.25.

A well written and practical source of general information on milk and restaurant sanitation for health officials. It appears to have been written for and accomplishes the purposes of giving administrators basic information in these branches of environmental sanitation for which there has been need. The views expressed are fairly representative of modern practice. The eleven appendicies contain much additional material in the form of references, information about field equipment and tests, and an outline of a course for the instruction of food handlers.

WALTER D. TIEDEMAN

Tuberculosis Hospital Planning and Construction — *By J. Bruno Basil, A.L.A., Architect (rev. ed.). New York: National Tuberculosis Association,* 1946. 81 pp. Price, $1.00.

The subject matter is treated in the manual or handbook style: the statements are readily understood; the reading of it is a pleasure and definitely invites a deeper investigation. All the major and many of the minor problems of tuberculosis hospital planning and construction are broadly presented, and various methods of solution are outlined. This pamphlet reflects wide research and objective analysis of a large amount of data. It is the best of its

type that the reviewer has ever seen and is earnestly recommended not only for those who are planning new building but also for those who are considering any extensive remodeling of existing facilities. N. STANLEY LINCOLN

BOOKS RECEIVED

ADMINISTRATION OF MEDICAL CARE; Problems and Issues. Research Series No. 2. By Odin W. Anderson. Ann Arbor: University of Michigan, 1947. 179 pp.

THE AMERICAN COUNTY-PATCHWORK OF BOARDS. By Edward W. Weidner. New York: National Municipal League. 1946. 24 pp. Price, $.35.

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY. W. A. Newman Dorland, M.D., with the collaboration of E. C. L. Miller, M.D. (21st ed.) Philadelphia: Saunders, 1947. 1660 pp. 880 ill. Price, $8.50.

CENTRAL MINING—RAND MINES GROUP. By A. J. Orenstein, M.D. Johannesburg, South Africa. Rand Mines, Ltd., 1946. 20 pp.

CHEMICALS FOR INDUSTRY. By Rohn & Haas Company. Philadelphia: Rohn & Haas, 1945. 212 pp.

CHICAGO-COOK COUNTY HEALTH SURVEY. By U. S. Public Health Service, 1947. Chicago: Chicago-Cook County Health Survey. 100 pp.

DEVELOPMENT DIAGNOSIS. By Arnold Gesell, M.D., and Catherine S. Amatruda, M. D. (2nd ed.) New York: Harper & Brothers, 1947. 496 pp. Price, $7.50.

DUNCAN OF LIVERPOOL. By W. M. Frazer, M.D. London: Hamish Hamilton, 1947. 163 pp.

DUST AND ITS EFFECTS ON THE RESPIRATORY SYSTEM. By George H. Gill, A.M.I., Mech. E. London: H. K. Lewis & Co., Ltd, 1947. 50 pp.

FOOD POISONING. By Elliot B. Dewberry (2nd ed.) London: Leonard Hill Ltd., 1947. 246 pp. Price $5.00.

FOOD REGULATION AND COMPLIANCE VOL. II. By Arthur D. Herrick. New York: Revere, 1947. 655 pp. Price, $10.00.

FUNGI VOL. I AND II. By Frederick A. Wolf and Frederick T. Wolf. New York: Wiley, 1947. Vol. I 438 pp. Vol. II 538 pp. Vol. I, Price, $6.00. Vol. II, $6.50.

THE HOOSIER HEALTH OFFICER. A Biography of Dr. J. N. Hurty and the History of the Indiana State Board of Health to 1925. By Thurman B. Rice, M.D. Indianapolis: Indiana State Board of Health. 388 pp. Free.

HOSPITAL CARE IN THE UNITED STATES. By The Commission on Hospital Care. A. C. Bachmeyer, M.D., Director of Study. New York: Commonwealth, 1947. 631 pp. Price, $4.50.

INTRODUCTION TO INDUSTRIAL MEDICINE. By T. Lyle Hazlett, M.D., Editor (2nd. ed.) Chicago: Industrial Medicine, 1947. 260 pp. Price, $3.00.

MEDICAL CARE AND COSTS IN RELATION TO FAMILY INCOME. Selected and compiled by Helen Hollingsworth, Margaret C. Klem, and Anna Mae Aney (2nd. ed.). Washington, D. C.: Government Printing Office, 1947. 349 pp. Price, $1.25.

NURSING. By Lulu K. Wolf, R.N. New York: Appleton-Century, 1947. 534 pp. Price, $3.50.

PHYSICAL FITNESS APPRAISAL AND GUIDANCE. By Thomas Kirk Cureton, Jr., Ph.D., Assisted by Frederick W. Kasch, John Brown, and W. G. Moss, Ph.D. St. Louis, Mo.: Mosby, 1947. 566 pp. Price, $6.00.

SCIENCE AND PUBLIC POLICY VOL. I. A Program for the Nation. A Report to the President by John R. Steelman, Chairman. The President's Scientific Research Board. Washington, D. C.: U. S. Government Printing Office, 1947. 71 pp. Price, $.20.

SCIENCE IN PROGRESS. Edited by George A. Baitsell (5th. Series) New Haven: Yale University Press, 1947. 353 pp. Price, $5.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Even Its Name Is Unsatisfactory—They Say—Perhaps it is enough for you to know that a British Rheumatic Fever Committee has surveyed the current status of the prevention and management of that disease and reports findings which—so far as I can see—are not greatly at variance with the pronouncements of the experts on this side of the water. The report is full of sound common sense such as this: nothing is so likely to restore a rheumatic child's morale, as a return to reasonable exertion. A suggestion is made that the disease might better be called "heart fever."

ANON. Rheumatic Fever. M. Officer. 77, 22:217 (May 31), 1947.

Citizens of Tomorrow—Although deaths among 5–14 year olds have dropped from 3.9 (per 1,000) in 1900 to 0.9 today, there is still plenty of room for improvement. Accidents (preventable) are the chief cause of death, with rheumatic fever, communicable diseases, and appendicitis poor seconds. Teeth conditions are shockingly bad.

ANON. Health Problems of School-Age Children. Stat. Bull. (Met. Life Ins.) 28, 5:3 (May), 1947.

Justified by Its Fruits—Boosted here is the "comics" book as a health educational device. From a happy experience with "Little Willie" the writer concludes that this dubious medium really produces results in action by those who won't read but will look at "the pitchers."

BILLINGS, T. E. Venereal Disease Education. J. Ven. Dis. Inform. 28, 8:162 (Aug.), 1947.

Shaping Nutrition Policies—Four useful papers on nutrition in public health administration begin with a world view by Boudreau, then follow a survey of new activities by Wilkins, a description of a State Department program by Getting, and further suggestions about administration by Goodhart. These names should convince you that the series is your meat.

BOUDREAU, F. G., *et al.* Nutrition in War and Peace (and three related papers). Milbank Quart. 25, 3:231 (July), 1947.

"That We Do the Job Right"—We have been trying to sneak sex education into people by disguising it with fancy names, says this writer. It's like flavoring cod liver oil with wintergreen: it may do the patient as much good but it doesn't taste any better.

GOFFIN, L. C. What Is Sex Education? J. School Health. 17, 6:151 (June), 1947.

Belsen — Coldly matter-of-fact, this account of the Army's delousing of the still-breathing remainder of the inmates—and the resulting prompt cessation of a typhus epidemic—manages to become an eloquent reminder that this hideous word will long remain the one perfect symbol of human bestiality.

DAVIS, W. A. Typhus at Belsen. Am. J. Hyg. 46, 1:66 (July), 1947.

Not Original But Good—Booster-dosing is still new enough to warrant calling your attention to an occasional review article, I assume. This is a useful one for you. Combined antigens, asserts the writer, not only do not interfere with each other but frequently they enhance the total effect.

GREENBERG, M. Use of the Booster Dose for Reimmunization. Pub. Health Nurs. 39, 8:382 (Aug.), 1947.

Out of U. S. A. by Denmark—Even though you are well versed in the essential elements of tuberculosis control programs you will be repaid for reading this eloquent and convincing plea for a world-wide attack on the disease.

HILLEBOE, H. E., and HOLM, J. Inter-National Control of Tuberculosis. Pub. Health Rep. 62, 31:1114 (Aug. 1), 1947.

Problem Drinkers Are Sick People—Man is the problem, not the bottle, the researchers in the field of alcoholism now assert. You'll be pleased with this broadminded account of plans for treatment, research, and legislation to meet our national "Lost Weekend."

HIRSH, J. Alcoholism: What Is It? Survey Midmonthly. 83, 6:163 (June), 1947.

Which Rodenticide Do You Use?—Though this paper is about the use of "1080" against rats on ships, it ends with the reminder that the poison is highly toxic for larger animals (including the alleged *sapiens* variety). The poison is a white powder which could be mistaken for flour or baking powder and probably will be. What to do if the mistake is made is set forth, but the moral seems to be: you'd better use ANTU.

HUGHES, J. H. Studies in Deratization of Surface Vessels by Means of 1080 (Sodium Fluoroacetate). Pub. Health Rep. 62, 26:933 (June 27), 1947.

Psychiatry Now Has Help To Offer—That there is any relationship between public health practice and mental hygiene is a relatively new concept and one not yet universally accepted. This is the opening premise of this paper. This introduction ought to be enough to enable you to decide whether or not you should know what the professor said about the subject to the International Health Organization.

LEMKAU, P. V. Mental Hygiene in Public Health. Pub. Health Rep. 62, 32:1151 (Aug. 8), 1947.

More About Infant Pincushions—A prophylactic timetable is proposed calling for jabs at 6, 7, 8, and 10 months, 1 year, 15 and 18 months, then at 2, 4, and 6 years. Thereafter tetanus toxoid every 2 years. Long before the "thereafter" is reached, friendship of the child and the doctor will be firmly established—on a strictly fighting basis.

MILLER, J. J. Immunization Procedures in Pediatrics. J.A.M.A. 134, 13:1064 (July 26), 1947.

On the Altar of Modern Efficiency—During the last five years, 84 California hospitals have had outbreaks of diarrhea of the new-born, some hospitals repeatedly. And this is not a uniquely dark record! The epidemiology of the disease, its clinical aspects, and correctional procedures are set forth. If there is a single, top-priority public health emergency, this would seem to me to be it.

MOORE, J. A., *et al.* Diarrhea of the Newborn. California's Health. 4, 24:189 (June 30), 1947.

Work and School—Seems incredible, doesn't it, that the (British) Health and Morals of Apprentices Act of 1802 could have permitted the employment of children for 12 hours a day. And another encouraged the factory employment of those who had reached the advanced age of nine. School and working conditions are better today for English children though there is still room for improvement—if these two papers are to be credited. They call forcibly to mind some of the related motes and beams in our own sociological eyes.

NEWTH, A. A. E. and LLOYD DAVIES, T. A. The Change from School to Industry. Pub. Health. 60, 9:177 (June), 1947.

Based in Reason and on Present Knowledge—On the assumption

that poliomyelitis virus is present more frequently and for a longer time in the intestinal tracts than in the throats of both cases and carriers, nine control measures are advocated—not with the idea that they will stop an epidemic but that because of them some persons may escape infection who might otherwise become paralyzed. Don't miss this!

SABIN, A. B. The Epidemiology of Poliomyeltis. J.A.M.A. 134, 9:749 (June 28), 1947.

World Food Needs — When you contemplate the rapidly increasing numbers of newly opened hungry mouths in India and China that will be turned toward us to be fed after we've taken care of starving Europe, do you sometimes wonder how it can be done? Well, here is one of those world-wide surveys to tell us that all the hungry could be fed if . . . . Did you know that only 7–10 per cent of the land area is cultivated? Did you know—you'd better read the questions as well as the answers yourself.

SALTER, R. M. World Soil and Fertilizer Resources in Relation to Food Needs. Science 105, 2734, 533 (May 23), 1947.

How To Tell Who's Undernourished—First of a series to inform health workers about the methods and the findings of nutrition demonstration units, this one gets off to an interesting start. You had better get in at the beginning.

SANDSTEAD, H. R. and ANDERSON, R. K. Nutrition Studies. Pub. Health Rep. 62, 30, 1073 (July 25), 1947.

This Will Slay You! — Average caries indices of a large sampling of post-war Italians in four cities were two to seven times lower than in the good-old U. S. A. The people examined were for the most part malnourished and the level of their oral hygiene was what you'd expect. It wasn't fluorine, either—or low carbohydrate intake. Suggested as two possible factors are shortage of refined sugar and vitamin B deficiencies.

SCHOUR, I. and MASSLER, M. Dental Caries Experience in Post-war Italy. J. Am. Dent. A. 35, 1:1 (July 1), 1947.

Promiscuous Mis-Use Deplored —This is medicine pure and simple, but the findings should be part of your public health "info" kit. Penicillin aerosol therapy is of definite value in the management of appropriate (but only appropriate) respiratory diseases. It should not be used against the common cold.

SEGAL, M. S., *et al.* Penicillin Inhalation Therapy in Respiratory Infections. J.A.M.A. 134, 9:762 (June 28), 1947.

Shoemaker's Children — Perhaps the most disturbing part of this grim but gripping discussion (which I advise you not to miss) is the list of famous stomach surgeons—and a roentgenologist who contributed a useful diagnostic sign — all of whom developed gastric cancers which had become inoperable before they could be recognized. Forty thousand out of the 150,000 annual cancer deaths are gastric. Indifference and inertia are more to be feared than cancer phobia, concludes the writer, as he urges us to get back of the preventive, educational program.

WAGENSTEEN, O. H. The Problem of Gastric Cancer. J.A.M.A. 134, 14:1161 (Aug. 2), 1947.

Maternal Rubella — This quotation, from *King Lear* may come in handy some day, so I pass it along to you: "That foul fiend, Flibbertigibbet . . . gives the web and pin (cataract), squints the eye, and makes the harelip." The modern-day name for Flibbertigibbet is rubella, when it attacks in the first trimester of pregnancy.

WESSELHOEFT, C. Rubella (German Measles). New England. J. Med. 236, 25:943 (June 19), 1947.

ASSOCIATION NEWS

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the Sections indicated.

Health Officers Section

Colin W. Brockington, M.D., D.P.H., East Kootenay Health Unit, Cranbrook, B. C., Canada, Director

Emilio Budnik, M.D., Dr.P.H., Casilla 9221, Santiago, Chile, S. A., Medical Officer, National Public Health Service

Dr. J. Leon Chenel, Saint Anselme, Co. Dorchester, P. Q., Canada, Medical Officer, Health Unit

Leoncio T. Davis, M.D., Medical Director, Vieques, Humacao, P. R.

Major John F. Harris, M.C., 294th Medical Prophylactic Platoon, APO 900, San Francisco, Calif., Venereal Disease Control Officer, Base Section, Philippines—Ryukyus Command

Huai-hsin Huang, M.D., 185 Dubail, Apt. 12, Shanghai, China, Director, Sinza Health Demonstration Center, Health League of China

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Laboratory Section

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Hubert E. Navarro, Belisario Salinas St. 291, La Paz, Bolivia, S. A., Chief, Departamento de Bioestadistica y Personal, Direccion General de Sanidad

Johannes Nielsen, United Nations Statistical Office, Lake Success, N. Y., Consultant

Manuel A. Perez, 205 Recinto Oeste, San Juan, P. R., Director of Personnel, Government of Puerto Rico

Ralph W. Roberts, M.S., State Health Dept., Montgomery 4, Ala., State Registrar and Director, Bureau of Vital Statistics

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Engineering Section

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Tom S. Gable, Allegan County Health Dept., Allegan, Mich., Public Health Engineer

N. Krishna Murthy, M.S., 927 First Ave.,

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Food and Nutrition Section

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Florence L. Marcus, M.D., 5230 Center Ave., Pittsburgh, Pa., Student, Harvard School of Public Health

Charles Mattlage, 312 Cherry St., Douglaston, L. I., N. Y., Asst. Editor, Health Officers News Digest

Robert C. Milligan, 323 Guaranty Bldg., Galveston, Tex., Secy., Anti-Tuberculosis Assn.

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Joseph A. Staton, M.P.H., 215 Commercial Bldg., Box 468, Raleigh, N. C., Field Secy., North Carolina Tuberculosis Assn.

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Public Health Nursing Section

Lorna J. Dillon, R.N., Box 319, Juneau, Alaska, Public Health Nurse, Juneau Public Health Center, Territorial Dept. of Health

Dorothy A. Dressler, B.S., in N., Territorial Dept. of Health, Seldovia, Alaska, Public Health Nurse

Celia M. Ferguson, 545½ S. Lincoln, Springfield, Ill., Orthopedic Nursing Consultant, Division of Services for Crippled Children, Univ. of Illinois

Margaret G. Harrison, 78 Ellis St., N. E., Atlanta, Ga., Asst. Supervisor, Metropolitan Nursing Service

Christine D. Kirsche, 146 Nassau St., Princeton, N. J., Asst. Supervisor, Division of Cancer Control, State Dept. of Health

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Ruth V. Thomason, Court House, Urbana, Ill., Nursing Consultant, Division of Services for Crippled Children, Univ. of Illinois

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Epidemiology Section

David H. Davis, M.D., M.P.H., 2629 North Potomac, Arlington, Va., Head of Epidemiology Unit No. 100, U. S. Naval Medical Center, Bethesda, Md.

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Joseph Stokes, Jr., M.D., 1740 Bainbridge St., Philadelphia, Pa., Professor of Pediatrics, Univ. of Pennsylvania

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3, Ga., Statistics, Communicable Disease Center, U. S. Public Health Service

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Edward Schwabe, M.D., Brocton, N. Y., General Practice

Dental Health Section

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March K. Fong, 590 Lake Park Ave., Oakland 10, Calif., Instructor in Dental Hygiene, Univ. of California

Unaffiliated

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William M. S. Lauder, M.D., 1715 E. Washington St., Charleston, W. Va., Asst. Director, Bureau of Tuberculosis Control, State Dept. of Health

Mae S. Straton, 1424 Kanawha Blvd., 8 Regal Apt., Charleston, W. Va., Administrative Asst., Division of Medical Services, State Dept. of Public Assistance

DECEASED MEMBERS

Prof. Irving Fisher, New Haven, Conn., Elected Member 1903, Elected Fellow 1922, Life Member, Forty Year Member, Vital Statistics Section

Francis E. Harrington, M.D., Minneapolis, Minn., Elected Member 1916, Health Officers Section

Vernon D. Irwin, D.D.S., Minneapolis, Minn., Elected Member 1937, Dental Health Section

William M. McKay, M.D., Salt Lake City, Utah, Elected Member 1937, Epidemiology Section

Guy H. Faget, M.D., Carville, La., Elected Member 1947, Health Officers Section

Eduardo Joublanc, Tampico, Tamaulipas, Mexico, Elected Member 1947, Engineering Section

Edward M. L'Engle, M.D., Jacksonville, Fla., Elected Member 1937, Vital Statistics Section

A.P.H.A. membership application blank on page XXXIV

EMPLOYMENT SERVICE

The following pages present information for those seeking qualified public health personnel and for those seeking positions in public health.

This is a service of the Association conducted without expense to the employer or employee.

Address all correspondence to the Employment Service, A.P.H.A., 1790 Broadway, New York 19, N. Y., unless otherwise specified.

Positions Available

(Supplemental to list in September Journal)

Trained **Laboratory Aids and Bacteriologists** needed in Wisconsin Civil Service. Three weeks' vacation with pay, sick leave, retirement benefits, permanency. Laboratory aids' salaries beginning at $155 and $180 a month. Bacteriologists at $190 a month. For further information write to the Bureau of Personnel, State Capitol, Madison 2, Wis.

1. **District Health Officers,** salary range from $5,160–$6,060 (including $30 per month cost of living bonus). Requirements: physician licensed to practise medicine in Wisconsin or eligible for license; under fifty years. The physicians selected under state Civil Service requirements would be eligible for an academic year of public health training at a generous stipend.

2. **Director of the Tuberculosis Control Division** (Medical Specialist in Publ c Health II). Salary $6,060–$7,260 (including $30 per month cost of living bonus). Requirements: physician, licensed to practise medicine in Wisconsin or eligible for license; degree from a recognized school of public health; three years' experience in the administration of public health activities. Special training and experience in the field of tuberculosis control desirable and may be substituted for the public health training and experience requirements. Write Wisconsin State Board of Health, Madison, Wis., for application blanks.

Physician for position in Michigan. Prefer pediatrician with training in public health, but will consider physician with public health training and experience in the field of maternal and child health. This is a special project and will be both interesting and stimulating. Salary $6,000 plus car allowance of 6¢ a mile. For further details contact Robert F. Hall, M.D., Director, Isabella County Health Department, Mt. Pleasant, Mich.

Experienced Laboratory Technician as chief technician of hospital laboratory, Northeast. College degree and several years' experience in bacteriology or chemistry. Military experience as laboratory officer highly regarded. Minimum starting salary $3,600. Write **Box L-537,** Employment Service, A.P.H.A.

1. **Senior Serologist.** Requirements: Bachelor's degree and one year graduate work in acceptable college or university, and two years' experience in same type of work.

2. **Senior Water and Milk Bacteriologist.** Requirements: Bachelor's degree with one year's graduate work in an acceptable college or university, and two years' experience in same type of work.

3. **Junior Biologist,** two. Requirements: Graduation from an acceptable college or university with major in biological subjects, preferably in bacteriology and serology. Address inquiries to C. F. Adams, M.D., State Division of Health, Jefferson City, Mo.

Health Commissioner for County of 40,000, Midwest. Possibility of including three cities located in the county in the County Unit. Salary open. Write **Box K-2,** Employment Service, A.P.H.A.

Physician as Director City-County Health Department, Eau Claire, Wis., population 56,000; staff of 14; ideal offices and laboratory. Salary for man with degree in public health $6,180 plus 6¢ per mile travel. Write Charles K. Kincaid, M.D., City-County Health Department, Safety Bldg., Eau Claire, Wis.

1. **District Health Officer.** Starting salary $4,800 plus $1,500 travel for personally owned car. Applicants over 45 years of age must have had previous experience in a full-time public health position.

2. **Venereal Disease Clinician.** Salary $4,500.

3. **Senior Bacteriologist-Serologist.** Salary $3,300.

4. **Senior Assistant Bacteriologist-Serologist.** Salary $2,400.

5. **Junior Bacteriologist-Serologist.** Salary $2,100. Positions are with the New Mexico Department of Public Health. For position requirements and application forms write: Merit System

Supervisor, P. O. Box 939, Santa Fe, N. M.

Bacteriologist in state branch laboratory, State of Colorado. Required: college degree with specialization in bacteriology. No residence requirement. Beginning salary $2,400, advancement possible. Write Dr. R. L. Cleere, M.D., Executive Director, State Department of Public Health, 414 State Office Building, Denver, Colo.

Public Health Staff Nurses for generalized program under supervision. Salary range $225–$275. Liberal car allowance. Write: Public Health Nursing Section, Oregon State Board of Health, 1022 Southwest Eleventh Avenue, Portland 5, Ore.

Public Health Nurses with training and experience for county health departments in Virginia. Salary range $2,563 to $3,360 plus travel. Liberal vacation provisions. Write State Health Commissioner, State Office Building, Richmond 19, Va.

Nurses for Tuberculosis Sanatoria (white and Negro) in Virginia. Salary for supervisor $2,428, for general duty nurse $2,160. Write State Health Commissioner, State Office Building, Richmond 19, Va.

Director and Staff Nurses for generalized program in City and County of 105,000 population. Educational and cultural center including three colleges. Salaries based upon qualifications for staff nurses ranging from $2,900–$3,440, and for Director $3,500–$3,700 per year plus travel. Apply: Health Department, Kalamazoo, Mich.

Public Health Nurses for generalized nursing program. Vacancies exist for graduate nurses to be trained as Public Health Nurses. Salaries range from $2,644.80 to $3,397.20 (P-1 grade). Public Health Nurses' salaries range from $3,397.20 to 4,149.60 (P-2 grade). Write to Dr. George C. Ruhland, Health Officer, or Mrs. J. P. Prescott, Director, Bureau of Public Health Nursing, District of Columbia Department of Health, Washington, D. C.

Public Health Nurses, Baltimore County Health Department. Population 250,000; urban, suburban, and industrialized areas; county seat 8 miles from Baltimore. Generalized service; director, 4 supervisors, 25 field nurses. Immediate large expansion planned. Beginning salary $2,300 (for trainee) to $2,700, depending on experience and education. Opportunity for increases up to $3,300. Retirement plan; one month's vacation; 5 day, 35½ hour week; sick leave. For use of personal car, allowance of 7 cents per mile. Write to Dr. William H. F. Warthen, Health Officer, Baltimore County Health Department, Towson 4, Md.

Staff Public Health Nurse for Department of Public Health, Oak Ridge, Tenn. Generalized Nursing Service for city of 35,000 population. Industry in connection with research and development of nuclear power. Minimum salary $2,709 per annum. Forty hour work week. Car furnished for all official work. Apply: Charles H. Benning, M.D., M.P.H., Director of Public Health, P. O. Box 486, Oak Ridge, Tenn.

Public Health Nurses with Certificate. Salary $230 per month; 40 hour week. Generalized program; opportunity for advancement. Write J. B. Eason, M.D., Director City Health Department, Spokane, Wash.

Two Public Health Nurses to teach in midwestern university. One responsible for certificate level program. One to develop program of study for graduate nurses preparing to integrate social and health aspects in basic schools of nursing. Must have Master's degree and a good combination of public health nursing experiences including supervision. Preference given to those with teaching experience. Beginning salary $4,000 for ten month contract. Write **Box N-398**, Employment Service, A.P.H.A.

Public Health Nurses for generalized program. Atomic energy project in State of Washington. Salary range $62.80 to $69.70 for forty hour work week. Automobiles furnished for work. Write Business Office, Kadlec Hospital, Richland, Wash.

Public Health Nurses are needed in Georgia: The State and County Departments of Public Health in Georgia invite qualified public health nurses to apply for permanent positions in Georgia. Staff nurses must have a minimum of six months' postgraduate public health nursing education in addition to acceptable basic training. Salaries range from $2,100 to $2,340 in addition to a liberal travel allowance. Supervisory nurses must have at least two years' experience in public health nursing as well as one academic year of postgraduate training in public health nursing. Salaries range from $2,400 to $3,000 in addition to travel allowances. Scholarships are available for graduate nurses who are interested in receiving public health nursing training. Write Personnel Administrator, State

Health Department, State Office Building, Atlanta, Ga., for application forms and full details.

District **Health Officers** for the State of Washington. Requirements: Graduation from an approved medical school, one year interneship and 3 years in professional medical work; or 1 year in professional medical work and 1 year's study in school of public health. Salary $6,000 to $7,140. Exceptional candidates can start above the minimum level. Write State Personnel Board, Washington State Department of Health, Smith Tower, Seattle 4, Wash.

Graduate in Bacteriology with some background in chemistry and experience in field of sewage and water research or treatment. To take charge of section in newly organized research project, Eastern United States. Salary $3,200–$4,200 depending upon qualifications. Write **Box L-535**, Employment Service, A.P.H.A.

Director of Nutrition for Red Cross Chapter in a midwestern metropolitan center. Candidate must have sound nutrition background and experience in community activity. Excellent opportunity to develop a broad program on a long-term basis with coöperation from health, education, social welfare, and business leaders. Salary open. Write **Box E-3**, Employment Service, A.P.H.A.

Positions are open in Georgia for county and district commissioners of health. Salaries for experienced public health physicians range from $6,600 to $7,500. Salaries for physicians with public health training who are entering the field range from $5,640 to $6,840. Liberal travel allowances supplement these salaries. Tenure of office is assured by a merit system. License to practise medicine in Georgia is required. Ample opportunities for training are offered with liberal stipend while in training. Write T. B. Abercrombie, M.D., Director, State Health Department, State Office Building, Atlanta 3, Ga., for application forms and full details.

1. **Sanitary Engineer** with training and experience. Maximum salary $4,200.
2. **Sanitarian** with experience in food and milk control, salary up to $3,000, for County Health Department, Southeast. County seat in large urban center. Write **Box E-516**, Employment Service, A.P.H.A.

Physician with experience or training in public health for Director of County health unit; headquarters in Bisbee, Ariz.; population 39,000; salary dependent upon training and experience; liberal flat rate for travel allowance. Apply Cochise County Health Service, Box 1193, Bisbee, Ariz.

School Physician for school district with a school population of more than 10,000. To take complete charge of the elementary program. Salary approximately $6,000. West Coast. Write **Box D-3**, Employment Service, A.P.H.A.

Sanitarian with experience in food handling and restaurant sanitation. Age 25 to 40 preferred. Health department experience necessary. Starting salary $3,000 plus ample travel allowance. Must be well educated and diplomatic. State education, experience, and age in reply. Must have own car. State of Wyoming. Write State Health Officer, Cheyenne, Wyo.

Physician for director of the health department medical services and to be assistant to the director of public health in one of the larger cities in Michigan. The work comprises supervision of child health conferences and school health programs, and communicable disease control including conduct of venereal disease clinics. Graduate from approved medical school with Michigan license. At least one year's public health training and experience preferred. Full-time position under merit system, opportunity for advancement. Vacation and sick leave and travel allowances. Salary dependent on qualifications. Give full particulars in first letter and earliest date available. Write **Box J-2**, Employment Service, A.P.H.A.

Registered Graduate Nurses: as ward supervisors. Beginning salary $180. Live in or out. Forty-eight-hour week. Uniforms and laundering of them if desired. Write immediately: Tennessee Department of Public Health. Division Tuberculosis Control, Nashville, Tenn.

Supervising Public Health Nurse and Public Health Staff Nurse in Alger-Schoolcraft Health Department in the Upper Peninsula of Michigan. Supervising nurse salary $2,700 plus travel expenses. Staff nurse salary $2,400 plus travel. Liberal vacation and sick leave allowed. Write to Dr. W. J. Broad, Director, Alger-Schoolcraft Health Department, Manistique, Mich.

Several qualified **Public Health Officers** in Texas. Salary range $5,500 to $7,200 per year plus travel allowance. Apply to George W. Cox, M.D., State Health Officer, Austin, Tex.

Applications for position of **Director of the Weld County Health Department,**

Greeley, Colo. Require graduation from Class A Medical School with training or experience in public health. Present salary is $500 per month plus travel expense. Please send qualifications in first letter and apply to R. L. Cleere, M.D., Executive Director, State Board of Health, State Office Building, Denver 2, Colo.

Well trained **Bacteriologist** capable of supervising bacteriologists working in state mental institution laboratories, $305–$365 monthly; also bacteriologists to be trained in state health department laboratory for positions in state mental institution laboratories, $190–$245 monthly. Write **Box L-539,** Employment Service, A.P.H.A.

Bacteriologist, male, minimum three years' experience in Public Health Laboratory; college graduate with major in bacteriology, preferably supplemented by courses in science leading to a Master's degree; $270 to begin, advancing to $340; Civil Service status; Retirement. Apply to: A. T. Johnson, Personnel Officer, Oregon State Board of Health, 1022 S.W. 11th Ave., Portland 5, Ore.

Laboratory Technician, male or female; college graduate with major in bacteriology, plus minimum of two years' experience in Laboratory; $200 to begin, advancing to $260; Permanent, Civil Service status; Retirement. Apply to: A. T. Johnson, Personnel Officer, Oregon State Board of Health, 1022 S.W. 11th Ave., Portland 5, Ore.

Supervisory Nurse, Nursing Education Director, and Staff Nurse positions available: City-County Health Department, generalized nursing program. Nursing Education Director, $2,940–$3,240, degree in public health nursing required. Supervisor, $2,520–$2,940, degree preferred. Sr. Staff Nurse, $2,220–$2,400, a certificate or its equivalent. Maximum salary reached in three year period. Forty-hour week, retirement plan, mileage. Write Dr. Geo. A. Denison, Box 2591, Birmingham, Ala.

Supervising nurse for City-County Department of Health. Thriving, progressive industrial and agricultural community of 74,000. Staff of nine nurses with promise of more in 1948. New and interesting developments, such as cancer diagnostic clinic, expanding school health program, additional child welfare clinics. Special Venereal Disease and Tuberculosis Clinics. Salary $3,192 plus $600 travel. Address Fred O. Tonney, M.D., Commissioner of Health, Municipal Building, Mansfield, Ohio.

POSITIONS WANTED

Position in School Health Education or Community Organization in public health. Seventeen years' experience in teaching and community organization in public health. M.S.P.H. from a leading university. East or Middle West preferred. Write **Box H-538,** Employment Service, A.P.H.A.

Sanitary Engineer with five years' experience in public health engineering, including waste disposal, insect control, and industrial sanitation, desires position in the East. M.S. degree in Sanitary Engineering. Veteran, age 29. Reply **Box E-510,** Employment Service, A.P.H.A.

Public Health and Sanitary Engineer. Master's degree in sanitary engineering. Experience: District Engineer with State Health Department 4 years; Sanitary Corps U. S. Army 4 years; consulting Sanitary Engineer 2 years. Some teaching experience. Seeks position in official agency, private industry or teaching institution. Write **Box E-518,** Employment Service, A.P.H.A.

Recent Graduate Veterinarian (KSC '47) desires employment. Has had experience working for the Health Department of the District of Columbia. Age 32, married, no children. Write **Box V-304,** Employment Service, A.P.H.A.

Veterinarian interested in any phase of Public Health Work, governmental or voluntary. Willing to undergo period of training. Training includes D.V.M. and B.S. degrees, with electives in chemistry, bacteriology, sanitation, animal micrology. Experience: University histology, laboratory, city health department diagnostic laboratory, senior consultant veterinarian, UNRRA. Write **Box V-306,** Employment Service, A.P.H.A.

Licensed Veterinarian: Public health and disease control experience in U. S. and abroad desires position in public health or industry. Write **Box V-308,** Employment Service, A.P.H.A.

Hawaii Board of Health Wants: One Public Health Statistician to direct the Bureau of health (vital statistics). (Salary: $407.08 to $481.67 plus $25.00 monthly bonus.) Qualifications: Five years of responsible statistical experience, of which three years shall have been of a research

and supervisory character in the field of public health, and graduation from a university of recognized standing with courses in advanced statistics, supplemented by one year of graduate work in public health with specialization in public health statistics. Write air mail to: President: Board of Health, P. O. Box 3378, Honolulu 1, Hawaii.

Qualified personnel to serve with Eighth Army in Japan and Korea. Civilian Status. One to 2 years minimum tour of duty. Periodic vacancies for: (1) Physicians as public health officers and welfare officers. (2) Public health nurses. (3) Sanitary Engineers. (4) Laboratory Workers. For information write to: Personnel and Training Branch, Civil Affairs Division, War Department Special Staff, Washington 25, D. C.

Advertisement

Opportunities Available

WANTED—(a) Director of nurses and several staff nurses; city-county health department; generalized program; headquarters in college town of 60,000; salaries, $3,500–$3,700 and $2,900–$3,400 respectively; Middle West. (b) Public health nurses for positions in South America; knowledge of Spanish available. (c) School nurse; public schools of town of 15,000 near Chicago; approximately 1,600 students. (d) Visiting nurse to join staff of industrial company; Chicago. (e) Public health nurse to supervise newly-constructed outpatient department; Hawaii. **PH9-1** Medical Bureau (Burneice Larson, Director) Palmolive Building, Chicago 11.

WANTED—(a) Health coördinator to work in conjunction with health departments of several towns and with health service of four high schools; would serve as liaison person on community health projects and as health educator; newly-created position; $3,800–$4,000; East. (b) Health educator; city health department, Middle West; $3,700–$4,100; (c) Sanitary engineers experienced with drainage problems, insect control, water purification and sewerage disposal; knowledge of Spanish advantageous; South America. (d) Health educator; university appointment; duties consist of teaching undergraduate and graduate courses in health education; Ph.D. or M.D., required. **PH9-3**, Medical Bureau (Burneice Larson, Director) Palmolive Building, Chicago 11.

WANTED—(a) Woman physician to join staff student health department, Middle Western university; recent graduate eligible; if maintenance desired, arrangements possible to serve as head of housing unit; duties include out-patient clinic work and supervising infirmary. (b) Public health physician to establish and maintain city physician's office; funds recently approved for staff consisting of public health nurse, laboratory and clerical assistants; $8,000; winter resort town, South. (c) Physician to join staff of student health department; will consider part-time arrangement; if full-time, $7,000—if half-time, $3,500; middle western metropolis. (d) Director and associate director of university student health service; appointments carry faculty rank; 12 month year, month vacation annually; town of 25,000; West. (e) Young physician for position of director of health and physical education; public school department of health; staff of 12 nurses, 2 dentists and approximately 40 physical education instructors; enrollment of 10,000 students; faculty of 6,000; town of 75,000 located short distances from several large cities including university medical center. **PH9-4**, Medical Bureau (Burneice Larson, Director) Palmolive Building, Chicago 11.

Advertisement

Opportunities Wanted

Young physician well qualified as health educator; B.S., M.D., and Master of Health degrees; several years, director of university health service where he has carried a rather heavy teaching load; for further information, please write Burneice Larson, Director Medical Bureau, Palmolive Building, Chicago 11.

Sanitary engineer; bachelor of science in civil engineering; Master's degree in public health engineering; since 1940 sanitary engineer with county department of health and part-time teaching (public health) in university; seeks greater responsibilities; for further information please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago 11.

Public Health nurse—B.S. degree in public health nursing; considerable work toward Master's; five years, metropolitan department of health; four years, school nurse and educational director; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago 11.

Young dentist; D.D.S., M.S. degrees; recently received Master's degree in Public health; considerable research work on problem of dental caries; for further information please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago 11.

Health educator; several years' experience in teaching the sciences before taking graduate training in health education; M.S.P.H., middle western university; eight years, director of health education, tuberculosis association; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago 11.

NEWS FROM THE FIELD

NOTE ON THE HEALTH CONGRESS OF THE ROYAL SANITARY INSTITUTE

TORQUAY, DEVON, ENGLAND; JUNE, 2–6, 1947

The Royal Sanitary Institute resumed in 1946 its series of annual Congresses, which had been interrupted by the war. The 1947 Congress, however, was the first since the war to which international delegations have been invited. A record number of 2,383 persons attended, of which 81 were overseas delegates* from 37 countries.

The Royal Sanitary Institute may be regarded as a British cousin of the American Public Health Association, although differing considerably in its history and type of membership. The Institute was founded in 1876, four years after the American Public Health Association, and it now has an enrollment of slightly more than 7,000. From the first it was an organization of sanitarians in the broadest sense, rather than primarily a medical organization. Statistics are not available, but it is believed that less than one-fourth of the present membership is made up of physicians. There are a relatively large percentage of civil, architectural, and sanitary engineers, and a substantial number of sanitary inspectors. The number of women members, especially in the public health nursing field, is relatively small.

Like the American Public Health Association, the Royal Sanitary Institute publishes a *Journal* (bi-monthly),† holds an annual Congress, and generally promotes interest in health activities. Local sectional meetings are also held at intervals. A function not paralleled by any organization in the United States is the holding of qualifying examinations for various types of health service workers. At present some fourteen different examinations are held, covering various aspects of the fields of health visiting (public health nursing), nursery nursing, and sanitary inspection. Although certificates granted by the Royal Sanitary Institute on the basis of these examinations do not have the official legal status of our state board examinations in medicine or nursing, they are in fact requirements for employment by health departments under regulations issued by the Ministry of Health. The Institute thus plays an important part in setting standards for health visitors and sanitary inspectors in the United Kingdom and to a considerable extent in the Dominions and Colonies.

The 1947 Congress was held in Torquay, Devon, on the south coast of England. Despite the general housing shortage in England, Torquay's hotels were able to accommodate the delegates without difficulty, perhaps because early June is well in advance of the peak vacation season. The town is built on steep hills rising sharply from a sheltered bay, and with the lush vegetation of this nearly frost-free corner of England, is a most scenic spot. The Mayor and his

* The United States Government delegation included Dr. Martha M. Eliot, U. S. Children's Bureau (Chairman); Dr. Harry S. Mustard, Director of the Columbia University School of Public Health; Captain Arthur W. Loy, M.C., U.S.N., Assistant Naval Attaché at the London Embassy, and the writer (Vice-chairman). Dr. Mustard and Dr. Eliot also officially represented the American Public Health Association as President and President-elect, respectively.

† The Proceedings of the Congress will appear in the July and September issues (Vol. 68, Nos. 4 and 5) of the *Journal of the Royal Sanitary Institute.*

staff provided the utmost coöperation in making the Congress successful, and officially entertained the delegates at a reception and a garden party. As was customary of pre-war meetings, a special luncheon was given in honor of the overseas delegates.

In contrast to meetings of similar organizations as usually arranged in the United States, the Congress was run along lines which gave much time for individual discussions between members and leisure for recreational activities. Sessions were scheduled in the mornings only, from 10 a.m. to 1 p.m.; three or four sessions were held each morning concurrently. The typical session consisted of a 20 minute address by the president of the section, followed by two papers of 30 to 40 minutes each. Several short speeches, proposing votes of thanks or introducing speakers, were interspersed, leaving about one hour during which the floor was thrown open for discussion.

The Congress was divided into seven sections: Preventive Medicine, Engineering and Architecture, Maternal and Child Health, Veterinary Hygiene, Food and Nutrition, Housing and Town Planning, and Tropical Hygiene. The sessions on Preventive Medicine and Maternal and Child Health included papers on "The Scope of Public Health after 1948," "The National Health Service and the Public Health Service," and "The Present Position and Prospects in Whooping Cough Immunization," several papers on various aspects of infant mortality including one on care of premature infants, and a group of papers on public health and industrial nursing.

Environmental sanitation was discussed in papers on "Milk: A Food for Thought," "Meat Transportation," and "The Work of a Sanitary Inspector at a Busy Fishing Port," and was touched upon in papers of the Veterinary Hygiene Section such as "The Importance of Cowshed Hygiene in the Transmission of Milk-borne Diseases," and of the Food and Nutrition Section in two papers on "The Microbiological Aspects of Food Quality."

The Tropical Hygiene Section heard a paper on *Anopheles* eradication in Cyprus, and an account of social welfare problems in tropical Africa.

The Engineering and Architectural groups discussed chiefly problems relating to slum clearance and development of planned housing "estates" (projects). These matters appear to be given more attention by public health workers in England than is commonly true in the United States; it is significant that the national agency dealing with housing is the Ministry of Health. A paper on "The Design and Location of Health Centres" was of especial interest to those concerned with development of these centres for the National Health Service.

Pervading the discussions of public health was the consciousness of the recently passed National Health Service Act of 1946, and its anticipated effects on the administration of public health, medical, and hospital services after the "appointed day" when the Act is to become operative, probably July 5, 1948. Not a word was said against the objectives and basic principles of the Act, which is to provide free and comprehensive public health, hospital, specialist, and general practitioner services to the entire population of England and Wales. Concern seemed to center around two general matters; first, the tripartite administration of the Service, and second, the danger of its administration being too far removed from the local level. Under the Act, preventive services will be administered by counties and county boroughs (roughly the equivalent of counties and large cities in the United States), general practitioner services will be administered by Executive Councils, each Council (with

rare exceptions) covering a county or county borough area, while hospital and specialist services will be the responsibility of Regional Hospital Boards. There will be approximately 140 administrative units in the first two groups, and 14 Regional Boards. It is evident that complex problems will arise in securing a properly integrated service. The Act provides devices for cross-representation at the various administrative levels, and the Medical Officer of Health could be a key person in coördinating the various health functions at the local level.

With respect to remote administration, there appears to be adequate provision in the Act for decentralization, but whether in fact a bureaucratic or a locally sensitive administration will be developed, will depend largely on the degree of responsibility delegated to the local bodies.

One of the most impressive aspects of the Congress was the large number of lay members of Local Authority Councils sent as delegates to the Congress. Many of the larger Authorities sent as delegates one or two members of their Public Health Committee as well as their medical officer of health and sanitary inspector. Some authorities sent only the chairman of the Public Health Committee; others only the medical officer of health. A high degree of interest in, and in many cases knowledge of, health needs and practices was shown by some of these delegates. Councillors and aldermen taking part in the discussions added a flavor which tends to be lacking from professional meetings in the United States.

A useful feature of the Congress was printing the major papers and distributing them in advance to all the delegates. This gave the delegates opportunity to study the papers prior to delivery and to present well prepared comments in the discussion periods.

The small number of sessions, leaving afternoons and evenings free, gave adequate time for the informal meetings and personal contacts which are perhaps the most important phase of such a congress. On the other hand, there were sufficient formal conferences to permit a substantial number of delegates to express their views during the discussion periods.

Particular note should be made of the hospitality extended to the overseas delegates by officials of the Royal Sanitary Institute and the city of Torquay. Everything was done to make our attendance at the Congress professionally profitable and socially enjoyable.

BURNET M. DAVIS, M.D., SURGEON, USPHS
Division of Public Health Methods

INSERVICE TRAINING COURSE IN THE COLLECTION AND DISPOSAL OF GARBAGE AND REFUSE

The School of Public Health, University of Michigan, Ann Arbor, Mich., announces a two day Inservice Training Course in the Collection and Disposal of Garbage and Refuse to be held at the School of Public Health Building, University of Michigan, Ann Arbor, Mich., on October 27 and 28.

The course is designed especially for the benefit of public works officials. However, others who are interested are invited to enroll and attend the course. The enrollment fee is $5, which should be paid at the time of registration. Enrollment will be closed on October 20. Applications should be submitted to the School of Public Health, University of Michigan.

The course will consist of presentation of various aspects of garbage and refuse disposal by individuals expert in the various subjects, followed by group discussions. The subjects to be discussed

will include the responsibility for control, methods of collection, and equipment for collection, and various specific methods of disposal.

NATIONAL BUREAU OF STANDARDS ESTABLISHES DIVISION OF COMMODITY STANDARDS

Dr. E. U. Condon, Director of the National Bureau of Standards, recently announced the consolidation of the Divisions of Commercial Standards and Simplified Practices to form the new Division of Commodity Standards.

The bureau has been serving actively as a coördinator in the development of voluntary simplified practices—elimination of uneconomical variety in manufactured products—and in the preparation of commercial standards as typified by the work of the American Standards Association and the American Society for Testing Materials. The Division of Simplified Practices will continue both of these activities and in addition will carry on the Federal Specifications work, vital in the preparation of specifications for government purchases. Edwin W. Ely, formerly chief of the Simplified Practice Division, has been appointed chief of the new division.

VENTILATION OF GARAGES AND PLANTS

Adequate ventilation of plants, warehouses, and garages, to eliminate carbon monoxide and other dangerous gases from gasoline-powered engines can be assured if enough air is in circulation in such places, according to a recent report of the Bureau of Mines. The publication is based upon one of a series of investigations of the occurrence and effects of toxic gases in the minerals industry. Investigations conducted for several years by the Health and Safety Branch of the Bureau of Mines has disclosed the fact that many gasoline-powered engines used in coal mines and tunnels are unsafe because of the dangerous gases generated and the hazard connected with the fuel. The same conditions may exist in garages. To determine the amount of air necessary for proper ventilation the investigators considered three factors: rate of fuel consumption, volume of exhaust gas, and the concentration of carbon monoxide in the gas.

Copies of the publication, *Ventilation Involved in the Use of Gasoline-Powered Equipment in Enclosed Spaces (Not in Mines or Tunnels)*, may be obtained free from the Bureau of Mines, Dept. of the Interior, Washington 25, D. C.

BUREAU OF DENTISTRY IN NEW YORK CITY HEALTH DEPARTMENT

A Bureau of Dentistry was recently created within the New York City Department of Health. Heretofore dental services have been provided through a division of the Bureau of Child Hygiene.

The director of the new division is Harry Strusser, D.D.S., who has been in charge of the dental division since 1929. Henry C. Sandler, D.D.S., is assistant director. The new bureau employs a total of 150 dentists and 141 dental hygienists.

DR. CAMERON HEADS AMERICAN CANCER SOCIETY

Charles S. Cameron, M.D., was appointed Acting Medical and Scientific Director of the American Cancer Society at the meeting of its Board of Directors in June. The appointment follows the resignation of A. W. Oughterson, M.D., Medical and Scientific Director and Vice President, who has served in this capacity since April, 1946.

Dr. Cameron came to the society in June, 1946, as Assistant Medical and Scientific Director. In January, 1947, he also assumed the duties of director of the Service Department.

SPECIALIST SERVICE TO OUTLYING TERRITORIES

On July 19, a group of five top staff

men from Cook County Hospital in Chicago took off from Minneapolis for Alaska. They were the first group in a project set up by the American Medical Association to take specialized service to the territories and Western Indian Reservations.

The specialists will carry with them facilities for a portable hospital and will spend a month in the territory.

In September, groups will visit Indian reservations in the West, and in December, 10 or 12 physicians will be sent to Puerto Rico and the Virgin Islands for similar services.

This is planned as a continuing project and more teams will be sent out next year.

"TRUSTEE" BEGINS PUBLICATION

The American Hospital Association announces the publication of a pocket size magazine for hospital governing boards to be called "Trustee." Editorially, it will be "educational, readable, and strictly pertinent to the realm of trustee responsibilities."

It is the result of the work of a special committee made up of Ray E. Brown, Superintendent of University of Chicago Clinics, Chairman; Graham L. Davis, Director, Hospital Division, W. K. Kellogg Foundation; R. O. D. Hopkins, Executive Director, United Hospital Fund of New York; and William B. Seltzer, Director, Mt. Sinai Hospital, Cleveland.

The price will be $2.00 per year for member trustees and administrators and $3.00 per year for other persons. The American Hospital Association, 18 East Division Street, Chicago 10, Ill.

FELLOWSHIPS FOR WOMEN

The American Association of University Women, 1634 I Street N.W., Washington 6, D. C., announces a group of fellowships for graduate study or research for the academic year 1948–1949. These fellowships are awarded *in general* to candidates who have completed two years of residency on work for a doctorate degree or have already received such a degree. The greatest importance is attached to the project on which the candidate wishes to work.

There are two types of Fellowships:

1. The National Fellowships are open to American women for study in the United States and offer $1,500, with one fellowship of $2,000.
2. The International Fellowships are open to members of the International Federation of University Women for study in the United States or abroad. One fellowship will be awarded to a Latin American woman for study in the United States. The awards in the international group of fellowships range from $300 to $1,500.

For detailed information address the Secretary, Committee on Fellowship Awards. Closing date for applications is December 15.

PREVENTION OF DERMATITIS

The July, 1947, issue of *Industrial Hygiene Newsletter* carries two items of interest on the subject of dermatitis. The first, "Poison Ivy—Hazard of Vocation and Vacation," gives a brief report on the present status of preventive measures to protect against possible contact with the plant. It also makes some suggestions with regard to treatment. The final paragraph should be of interest to many—"Injudicious treatment of poison ivy is often worse than no treatment at all. It must therefore be emphasized that any severe case of poison ivy dermatitis should be cared for by a physician."

The second item is one of a series of discussions. This is part II entitled, "Occupational Dermatitis and Methods of Prevention—Cleanliness." Louis Schwartz, M.D., and Paul C. Campbell, Jr., M.D., the authors, explain the importance of cleanliness including the body and clothing in prevention of occupational dermatitis. They go further to

outline precautions that should be taken by certain persons for whom the usual cleaning agents might not be suitable.

The *Industrial Hygiene Newsletter* is published by the U. S. Public Health Service, Washington, D. C.

NEW YORK STATE CEREBRAL PALSY COMMISSION REPORTS

The year-old New York State Legislative Cerebral Palsy Commission recently made a preliminary report to the state legislature. It found that the State Department of Health carries over 4,600 such cases on its registers, that another thousand are under the care of the Department of Mental Hygiene, and that approximately one-third of all children in special classes in public schools are victims of cerebral palsy.

At present, although there is no known cure for those who have normal mentality (65 to 75 per cent of all), "there is perhaps no other group for whom rehabilitation to even a slight degree makes so much difference and is so important." The Commission has reached the following conclusions:

1. State care of cerebral palsy victims is inadequate and insufficient although its responsibility for this group is the same as for other disabled groups.
2. Specialized diagnostic and treatment centers should be available at an early age for every child afflicted.
3. Educational, medical, and therapeutic services should be expanded and integrated.
4. Inpatient care should be provided for those in need of such care.
5. At least one model center for diagnosis, treatment, and research should be established as soon as possible.
6. Specialized training for physicians, nurses, and teachers for this field should be stimulated.
7. The present formulae for state and federal assistance for the care of such cases should be restudied.

The first model center to be established will probably be at LeRoy, N. Y., on a fifty acre estate offered to the University of Rochester for that purpose by Mr. and Mrs. Ernest L. Woodward. Operational costs for treatment services would be supplied by the state, and research and training would be conducted by the university's medical school, Strong Memorial Hospital staff, the National Foundation for Infantile Paralysis, and other groups.

ATOMIC RADIATIONS UNIT FORMED

Dr. J. G. Townsend, Chief of the Industrial Hygiene Division, U. S. Public Health Service, recently announced the formation of an Atomic Radiations Unit in the Chemical Section of the Division. Mr. Duncan Holaday, Engineer (R), is in charge of the new Unit.

In making announcement of this new activity, Dr. Townsend expressed the belief that many institutions and industries have been handicapped in their use of radioactive isotopes and high energy machines because of their lack of information about the safe handling of dangerous quantities of radioactive materials. The new Atomic Radiations Unit, working through industrial units in the states, will help institutions and industries evaluate their hazards and establish safe working conditions.

LANSING-INGHAM COUNTY HEALTH UNIT

The City of Lansing and the County of Ingham in Michigan became a consolidated county health unit on July 1. Its director is Roelof Lanting, M.D., who previously served as Lansing City Health Officer. The combined population (1940) of the city and county is about 130,000.

DR. KESSLER HEADS NATIONAL COUNCIL ON REHABILITATION

The election of Henry H. Kessler, M.D., as President of the National Council on Rehabilitation (1790 Broadway, New York 19) was recently announced.

Dr. Kessler is Chairman of the Council on Industrial Health of the American

Medical Association, and Consultant in Orthopedics and Prosthesis Services to the Federal Office of Vocational Rehabilitation, and a member of the New Jersey State Rehabilitation Commission. His "cineplastic amputation" technique is unique in the field of surgery. He spoke before the British Council on Rehabilitation in London on July 25.

FEDERAL GRANTS FOR MENTAL HEALTH RESEARCH

The first federal grants for research in mental health under the new National Mental Health Act—25 grants to institutions or individuals in 9 states—were recently announced by Thomas Parran, M.D., Surgeon General of the U. S. Public Health Service.

This program was authorized by the U. S. Congress in 1946 and received an appropriation of 7½ million dollars on July 8, 1947. In addition to the mental health activities of the Public Health Service, this will finance a threefold program of research on mental illness, development of local mental health facilities, and training of mental health personnel.

"EYE-BANK" SET UP IN NEW ORLEANS

An affiliated "Eye-Bank" has been organized in New Orleans, La., which will have the coöperation of the Louisiana State University Medical School and the Tulane University Medical School and Hospital, it was announced recently at national headquarters of The Eye-Bank for Sight Restoration, Inc., 210 East 64th Street, New York. Other affiliated Eye-Banks are functioning in Boston and Chicago.

PHARMACY SECTION IN HOSPITAL DIVISION, U.S.P.H.S.

A newly created pharmacy section has been established in the Hospital Division of the U. S. Public Health Service for the further development of the pharmaceutical activities in the Marine Hospitals and their adjunct medical relief stations. This action brings an organized pharmacy service for the first time to the oldest of the hospital groups operated by the federal government.

The new pharmacy service in the Hospital Division will be under the direction of George F. Archambault, graduate and former faculty member of the Massachusetts College of Pharmacy.

DR. SAYERS LOANED TO UNITED MINE WORKERS

R. R. Sayers, M.D., Medical Director, U. S. Public Health Service, and Director of the U. S. Bureau of Mines since 1940, has been granted leave without pay to accept the chairmanship of the medical board recently established by the Trustees of the Welfare and Retirement Fund of the United Mine Workers of America. In this position, Dr. Sayers will advise trustees of the miners' fund on health and medical problems. He will also assist state and local public health authorities, as well as coal operators and unions, in carrying out recommendations contained in the Medical Survey of the Bituminous Coal Industry issued last spring by Rear Admiral Joel T. Boone.

Assignment of Dr. Sayers to this position is in line with the Public Health Service policy of making expert personnel available to official and voluntary non-profit organizations to assist in the developmental stages of new and significant health undertakings.

CHILDREN'S BUREAU GRANT AT HARVARD SCHOOL OF PUBLIC HEALTH

To provide for expansion of the educational program and the facilities for training in the field of maternal and child health and related branches of public health, the Harvard School of Public Health has received a grant of Children's Bureau funds from the Massachusetts Department of Public Health. To the basic disciplines will be added

further training in nursing, social service, and especially the administrative aspects of child health. Further field training facilities will also be developed.

JOURNAL OF THE INTER-AMERICAN ASSOCIATION OF SANITARY ENGINEERS

Volume I, No. 1 of the *Journal of the Inter-American Association of Sanitary Engineers* was published in July, 1947. As the name indicates, this is the official *Journal* of the recently organized Inter-American Association of Sanitary Engineers (see *A.J.P.H.* of July, 1947, p. 955, for an announcement of its formation).

The lead article in the first issue of the new *Journal* is "The Sanitary Engineer Looks Forward," by Abel Wolman, Dr. Eng., previously published in professional magazines of the United States, including the *American Journal of Public Health,* November, 1946. The *Journal* uses both the English and Spanish versions of all original articles; for articles already published elsewhere, only the language is used in which the article has not appeared.

NEW ARMY MEDICAL CENTER

What is planned to be the greatest medical research center in the world will be built at Forest Glen, Md., by the Corps of Engineers for the Office of the Surgeon General, AUS, according to a recent announcement made by Major General Raymond W. Bliss, the Surgeon General. In keeping with technological advances in all fields, the center will be equipped to anticipate and meet the medical problems of the future as well as to cope with those of the present.

Designated as the "Army Medical Research and Graduate Training Center," the project will consist of a 1,000 bed general hospital capable of expansion to 1,500 beds; the Army Institute of Pathology building; the Army Medical Museum and Center Administration building; Central Laboratory Group buildings; and the Army Institute of Medicine and Surgery. A working library, animal farm, staff quarters, and other buildings are included in the plans.

PERSONALS

Central States

FRANK F. BOWMAN, M.D.,† on May 1 retired as Health Officer of the city of Madison, Wisc., a position he has held for 19 years. He was honored at a farewell dinner given by present and former employees of the city health department.

LEWIS DODSON,* formerly Director of Public Health Practices for the National Sanitation Foundation at the University of Michigan School of Public Health, Ann Arbor, became Director of Environmental Sanitation of the City-County Health Department, Denver, Colo., effective September 1.

SOPHIE FEVOLD, R.N.,† was appointed on August 1 as Director of the Public Health Nursing Association of Des Moines, Ia. She was previously assistant Director of the Dayton, Ohio, Visiting Nurse Association for 9 years.

MARION I. MURPHY,† has been appointed Associate Professor of Public Health Nursing, University of Michigan, Ann Arbor, Mich., as of August 1. Miss Murphy was formerly Assistant Director of the Bureau of Public Health Nursing, Michigan Department of Health.

A. NEUWIRTH, M.D.,† is at present stationed in Germany as the Medical Director for Germany for the American Joint Distribution Committee. Dr. Neuwirth was formerly Health

* Fellow, A.P.H.A.
† Member, A.P.H.A.

Officer, Iron-Ontonagon Health District, Mich.

J. BURRIS PERRIN, M.D.,† became Deputy Health Commissioner and Director of the Division of Maternal and Child Health of the Peoria, Ill. Health Department on July 1. He was most recently in the Medical Corps, AUS, and Director of the Division of Maternal and Child Health and Crippled Children in the Colorado Department of Health.

A. LLOYD TAYLOR, M.D., has accepted a position as Research Supervisor in the Wyandotte Chemicals Corporation Research Laboratories, Wyandotte, Mich., where his experience will be applied in the field of industrial detergents. Dr. Taylor has had many years experience in this field both as Director of Research for Oakite Products and as Director of the Department of Chemistry for Pease Laboratories, New York.

Eastern States

ANNA M. BANUS, nutritionist in the Berkshire district office of the Massachusetts Department of Public Health, has resigned to accept a position as assistant professor in the Department of Home Economics of Western Reserve University, Cleveland, Ohio.

FRANK E. COUGHLIN, M.D.,† has been named County Commissioner of Health of Rensselaer County, N. Y.

WILLIAM P. FORREST, M.D., has been appointed assistant director of the WHO Interim Commission Headquarters Office in New York City. He was chief medical officer with the United Nations Relief and Rehabilitation Administration's mission to the Ukrainian Soviet Socialist Republic.

SUE T. GOULD, M.D.,* Columbia County, N. Y., Commissioner of Health has resigned that post, effective October 1.

GRANVILLE W. LATIMORE, M.D., M.P.H.,* Director of the Education Department, American Cancer Society, New York, N. Y., has resigned to accept appointment as Director of the Bureau of Health Education, New York State Department of Health, Albany, N. Y.

MADELEINE LAY, has been appointed Education Secretary of the American Association of Psychiatric Social Workers, New York, N. Y., to act as an adviser to schools of social work and to social work departments of universities in setting up standard curricula for the training of psychiatric social workers. This work has been made possible by a grant from the Commonwealth Fund for 2 or more years.

JAMES E. PERKINS, M.D.,* was appointed Deputy Commissioner of Health of New York State. Associated with the New York State Department of Health since 1934, Dr. Perkins has served successively as Epidemiologist, District State Health Officer, and as Director of the Division of Communicable Diseases. On January 1, 1946, he was appointed Deputy Commissioner by former Commissioner EDWARD S. GODFREY, JR., M.D.,* recently retired.

DAVID D. RUTSTEIN, M.D.,* has been appointed Professor of Preventive Medicine at Harvard Medical School, Boston, Mass., succeeding JOHN E. GORDON, M.D.,* who since July 1, 1946, has been head of the department of epidemiology in the School of Public Health. Since 1946, Dr. Rutstein has been Medical Director of the American Heart Association and the American Council on Rheumatic Fever and a consultant to the Joint Research and Development Board of the Departments of War and Navy.

CHARLES D. SHIELDS, M.D.,† has resigned the position of Commissioner of Health of the City of Buffalo,

N. Y., to accept a commission as major in the U. S. Army Medical Corps. EDWARD B. BUKOWSKI, M.D.,† who has been Buffalo's deputy health commissioner, has been appointed acting commissioner.

Southern States

J. C. CANADA, M.D., was named Director of the Pontotoc County Health Department, Ada, Okla., effective July 3.

FREDERICK A. JOHANSON, M.D., has been named Director of the U. S. Marine Hospital (National Leprosarium) at Carville, La., by the U. S. Public Health Service. He has been with the institute for over 20 years. Dr. Johanson succeeds G. A. FAGET, M.D.,† former director, who died recently.

VICE ADMIRAL ROSS T. MCINTIRE, wartime Surgeon General of the U. S. Navy, and formerly White House physician, has been named director of the new National Blood Program of the American Red Cross. Dr. McIntire will have supervision of the most far-reaching health program in the peacetime history of the Red Cross being undertaken in direct response to the urgent need of the medical profession for blood in saving of life as well as in treatment and prevention of disease.

MASON ROMAINE, M.D.,* became Director of the Division of Cancer Control of the Virginia State Health Department July 1, after serving as full-time public health officer in Petersburg, Va., since 1941.

WILLIAM B. ROSSMAN, M.D., has been appointed Director of the Bureau of Mental Health of the West Virginia State Department of Health. Plans for the new bureau were completed by the Public Health Council at a meeting in Charleston June 30.

MARY JANE SCOTT, Senior Nutritionist with the Arkansas State Health Department since 1942, has resigned to become a Professor of Home Economics Education at the University of Arkansas.

GEORGE L. WINN, M.D.,† resigned as Director of the Comanche County Health Department, Lawton, Okla. effective June 30.

Western States

PHILIP A. BEARG, M.D.,* has resigned as Health Officer of San Luis Obispo County, California.

MAURICE BRODSKY, M.D., of the U. S. Public Health Service, was recently appointed assistant chief of the Hawaiian Tuberculosis Bureau. He replaces WILLIAM MURLIN, M.D., who joined the staff of Leahi Hospital, Hawaii.

LLOYD FLORIO, M.D., Dr.P.H.,* Professor of Public Health and Preventive Medicine at the University of Colorado Medical Center has been loaned to the city of Denver for a 6 month period to reorganize the City and County Health Department on the basis of a comprehensive survey recently completed by EDWARD G. MCGAVRAN, M.D.,* new dean of the University of North Carolina School of Public Health.

CHANGES IN HEALTH PERSONNEL IN STATE OF OREGON:

F. HERBERT COLWELL, M.D.,† has been reappointed to the post of Director of the Vital Statistics Section of the State Board of Health. Dr. Colwell held the position until early this year, but resigned to accept an offer in Washington State.

LAURA P. WELLS,† has resigned as Nutrition Consultant for the Maternal and Child Health Section to supervise the school lunch program of the State Department of Education.

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* Fellow, A.P.H.A.
† Member, A.P.H.A.

JAMES V. HAWKINS,† is the new Sanitarian in Klamath County, replacing LLOYD SEALEY, who resigned in May. Mr. Hawkins has served with the U. S. Public Health Service in Kansas City and as a sanitarian in Alaska, Washington State, and Texas.

WILLIARD J. CLOYES has resigned as Sanitarian of Lane County, a position he held since 1940 to become city manager of Springfield, Ore.

G. D. CARLYLE THOMPSON, M.D.,† was appointed Director of the Division of Preventive Medical Services for the State Board of Health, August 1. Dr. Thompson also became State Epidemiologist. He was the first Maternal and Child Health Director of the State Board of Health, having served in that capacity from 1937 to 1940 and during the war was attached to the Surgeon General's Office in Washington, D. C.

EDWARD A. REINKE,* has been appointed Chief, Bureau of Sanitary Engineering, California State Health Department, effective July 1. Mr. Reinke's appointment follows 27 years of service in the Bureau of Sanitary Engineering.

F. E. WIGGINS, M.D., has replaced FRANK M. GARDNER, M.D., as the Health Officer of the City of San Bernardino, Calif.

Foreign

C. K. CHU, M.D.,* has been named assistant director of Field Services for China, WHO Interim Commission. Dr. Chu received his M.D. degree from the Peking Union Medical College and a degree of Doctor of Public Health from Yale Medical School. He has been granted one year's leave from his post as director of the Chinese National Institute of Health to work with WHO.

DOMINGO F. RAMOS, M.D.,* of Havana, Cuba, left New York on July 30 for a tour of Latin American countries in connection with the emergency feeding program for children in war devastated countries. Dr. Ramos, who serves on the faculty of the Medical College at the University of Havana, was formerly Minister of Health of Cuba.

Death

GUY HENRY FAGET, M.D.,† for 25 years a distinguished officer of the U. S. Public Health Service, and noted for his pioneer work in treating leprosy with sulfa drugs, died July 17 in the U. S. Marine Hospital, New Orleans, La.

CONFERENCES AND DATES

American Association for the Advancement of Science, Chicago, Ill. December 26–31.

American Dietetic Association. Philadelphia, Pa. October 13–17.

American Public Health Association—75th Annual Meeting. Atlantic City, N. J. October 6–10.

American Public Welfare Association. Annual Round Table. Cleveland, Ohio. December 3–7.

American Public Works Association. Jacksonville, Fla. October 5–8.

American Water Works Association:

- Four States Section. Washington, D. C. November 19–21.
- Iowa Section. Cedar Rapids, Iowa. October 9–11.
- Joint Meeting—Florida and Cuban Sections. St. Petersburg, Fla. November 20–22.
- Missouri Section. Governor Hotel, Jefferson City, Mo. October 27–28.
- New Jersey Section. Atlantic City, N. J. November 6–8.
- North Carolina Section. Greensboro, N. C. November 10–12.
- Southeastern Section. Atlanta, Ga. November 3–5.
- Southwest Section. Amarillo, Tex. October 13–15.
- Virginia Section. Roanoke, Va. November 17–18.

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